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BETWEEN ARCHAEOLOGY AND ANTHROPOLOGY: IMAGINING NEOLITHIC SETTLEMENTS

ABSTRACT: Modelling of the Neolithic settlements space of the Central Danubian Europe, regardless of its landscape or village scopes, is always linked with longhouses. This is supposed to be a feature which structured the culture of early farmers. Two important aspects of the Neolithic house – its profane social complexity on one hand, and its sacred quality on the other – have been highlighted many times. But on what data can we infer its original appearance, function and duration? The find context is limited in terms of the original wooden construction, the archaeological imprint of which consists solely in a system of post holes. The aim of this text is therefore to present the existence of ethnographic parallels of the Central European Neolithic longhouses. Our purpose is certainly not to create direct analogies, but to induce basic imagination. Three particular cultural areas and the local populations show that the dwelling form could have had many features (e.g. construction of post, rectangular ground plan, roof form) in common with the original Neolithic houses. Both ethnographic and ethnoarchaeological evidence also re-open the issue of the so far unconfirmed construction properties of the long Neolithic houses (e.g. construction material, floor level). Other, culture dependent features observed at ethnographic cases (number of inhabitants, length flexibility, and lifespan) could contribute to creation of archaeologically testable interpretation models.

KEY WORDS: Neolithic longhouse – Ethnographic analogy – Settlement patterns

INTRODUCTION

During the last three decades there has been a significant transformation in the overall conception of the Neolithic culture of the Central European arena and particularly in its Danubian province. The key factor in the cultural changes at the cusp of the Mesolithic and Neolithic periods was the archaeological horizon of the Linear Pottery Culture (LBK; 5500–4950 cal BC), which researchers have already spent nearly a century studying (Lüning 2005). It is nowadays considered that the transformation in the imaging and the interpretative

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concepts of this period was the result not so much of the increase in new information in the form of archaeological data, but rather of the natural dynamics of the development of archaeological theory. The framework of reference based on direct adaptation to natural conditions (Bakels 1978, Marshall 1981, Rulf 1983) was – and still is – moving towards the world of symbols (Bradley 2001, Hodder 1990), the active role of artefacts (Pavlů 2010) and the formative processes of the archaeological material (Hachem 2000, Květina 2010a). The concept established earlier of stable agricultural villages surrounded by slash-and-burn fields (Lüning 1988, Soudský 1962) reached a dead-end when it began to confront comments made both by archaeologists (Pavlů 2000) and archaeobiologists (Bogaard 2004). At the same time this new concept is based more than ever on anthropological models thereby providing a new perspective on the world of the first Central European farmers.

How does this new concept of the Neolithic settlement pattern differ from the original one? Primarily this viewpoint began to generate the concept of the existence of a considerable proportion of the initial post-Mesolithic population amongst the population of the first Central European farmers (Bickle *et al.* 2011, Zvelebil, Pettitt 2012). Evidence of the diverse origins of people, whose cultural relics are referred to as the LBK, also suggests, however, the probably diverse habitats that they were creating (Bentley 2007). The seemingly "culturally unified" area of the geographic distribution of the LBK therefore probably only represents a mask beneath which lies the original palimpsest of diverse identities (Modderman 1988). These may have manifested not only in the form of social diversity, but also in economic or subsistence differences, perhaps even within the same settlement area (Hachem 2000).

This inconsistency should also give rise to an interpretative scheme of the social organisation and the identity of Neolithic communities. Given the current state of knowledge of the extent of political integration of archaic societies, working with the concept that these were small units not exceeding the basic level of Durkheim's organic solidarity can be justified (Květina 2010b). In the archaeological sources the manifestation of a formula of this nature is represented by settlements, whether we define them as villages, farmsteads or clusters of houses. The society, the entire political and economic communal activities of which take place at the level of a settlement, has been assigned the anthropological label of an autonomous village (Carneiro 2002). The basic unit structure of all the static and dynamic components of such a culture is the residential unit, which, in the case of the Danubian Neolithic period is represented by the longhouse.

THE NEOLITHIC LONGHOUSE: IT'S ESSENTIAL FEATURES

The history of the research into the structure of Neolithic dwellings has been in progress during a very long period (*Figures 1, 2*). In the 1930s their examination was restricted solely to those excavated in Köln-Lindenthal in Germany where their residential nature was attributed to their structural form of long pits – defining them as "pit-houses" (Buttler, Haberey 1936, Paret 1948). The prior lack of evidence has been more than sufficiently supplemented by a number of subsequent excavations across the entire area of Western and Central Europe, i.e. in Sittard (Modderman 1958), Elsloo and Stein (Modderman 1970), Geleen (Waterbolk 1958), Olszanica (Milisauskas 1986), Darion (Keeley, Cahen 1989) and sites on the Aldenhovener Platte (Boelicke *et al.* 1994, Lüning 1997) and in the Aisne valley (Ilett *et al.* 1982). In terms of the size of the area investigated and of the duration of the project one of the largest field projects has been carried out since the 1950s in Bylany, near Kutná Hora in the Czech Republic (Pavlů *et al.* 1986).

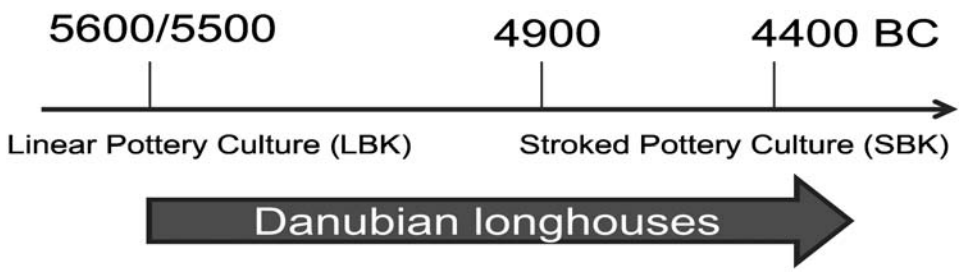

FIGURE 1. Chronology of the Danubian Neolithic longhouses (cal BC).

Since ca. 1960 it has been evident that aboveground longhouses constituted a key element of the settlement world of Neolithic farmers. These structures, referred to as European Neolithic longhouses, are related chronologically to the culture of the earliest farmers in Central Europe (*Figure 1*). This, together with its subsequent development, is identified archaeologically as the Linear Pottery Culture (LBK). The origination of the Neolithic longhouse is only anticipated: it is assumed that this actually occurred in the Carpathian basin, in association with the genesis of the LBK (Lenneis 2004: 151, Startin 1978: 153).

By the nineteen-sixties the ground plan of a Neolithic house was generally known and, in association with the pits in its vicinity, it was defined as a house complex (Pavlů 1977: 13, Soudský 1962). The remaining traces of longhouses are defined by their standard pattern of postholes and grooves. The walls, and probably other parts of the house, were plastered. The negative imprints of construction details of structures on daub also provide important information about the house construction.

A Neolithic longhouse was typically a quadrangular aboveground building (*Figure 2*). Its length ranged between 6 and 45 m and its width between 6 and 7 m. The great variability in the length of houses is consistent with the occurrence of extremely long buildings. To relativise these values it can be noted that in Bylany their length is usually between 6 and 20 m, while at the Olszanica site it ranges between 6 and 26 m (Whittle 1992: 80).

Throughout its length the construction of the building is based on five rows of columns, most commonly of oak wood (Whittle 1996: 163). The relative distance between the poles and the pattern of their positioning has given rise not only to an interpretative concept of the original design of the building, but also to a basic typology (Coudart 1998, Modderman 1970, 1986). We shall not be discussing the latter here so let us simply state that a Neolithic house generally took on one of three different forms. These are derived from the presence of three aspects, (the southern, the central and the northern part) and hypothetically they are defined as modules serving for storage, for living and possibly for sacral purposes. It should be noted that this interpretation of the usage of these parts of the longhouse is not supported by any de facto evidence. The modules, by their mutual, though not arbitrary, combination, established the final size of the building. The individual modules were separated from each other by triplets of poles placed a shorter distance apart from each other than was customary. In addition to the general information that the skeleton of the structure was formed from a pole frame and that the walls were clayed, no other evidence concerning the form of Neolithic longhouses has been preserved. Still remaining unknown are the height of the structure and also the occasionally considered existence of a raised floor (Rück 2007). This will usually be reconstructed only in one part of the house (either on the southern or the northern side), where the density of the poles is increased or where there is a trough foundation. Usually considered is not the existence of a full-fledged floor, but rather of a lighter-built attic (loft) (Whittle 1992: 81).

While the form of the roof is based on clay models designed with a pitched roof, its actual structure and cladding material remain unclear. While earlier works assumed a reed or a straw covering (e.g. Bogucki 1995), currently the ethnographically supported concept is that the covering also included the use of wooden boards (Pavlů, Vavrečka 2012, Sklenářová 2003: 29) (*Figure 3*).

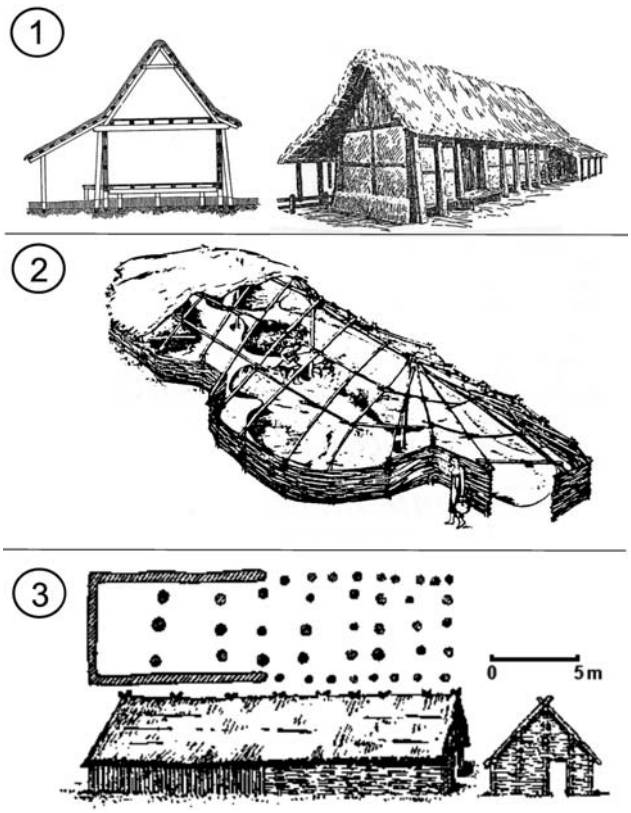

FIGURE 2. Development of graphic reconstructions of the Danubian Neolithic residential structures: 1, from the site Deiringsen/Ruploh (after Stieren 1934: 99); 2, from the site Köln-Lindenthal (after Buttler, Haberey 1936); 3, from the same site (after Paret 1948: 67).

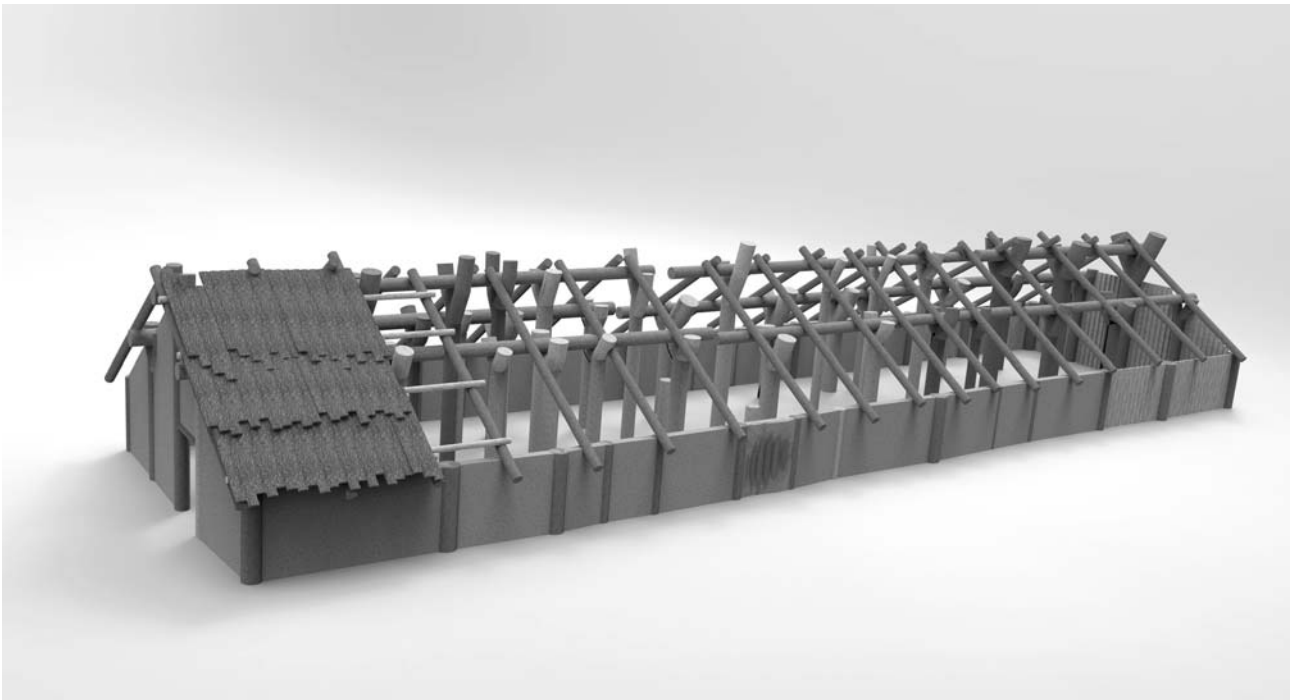

FIGURE 3. Virtual model of the Neolithic longhouse roofed with wooden planks. Illustration by Š. Kravciv.

One of the most significant obstacles to understanding the original form and function of Neolithic longhouses is the absence of the preservation of their living floor levels. From the thousands of already known ground plans of longhouses there are only two with a claim for the intactness of their original flooring. The prime example, referred to many times in the literature, is the Postoloprty site in Bohemia where four heating units were discovered (Soudský 1969). The circumstances of this discovery have always been very unclear, however, and therefore its interpretation also soon encountered criticism (Modderman 1973) and eventually a complete review was undertaken (Lička 2012) leading to the rejection of Soudský's original analysis. The second and more recent evidence concerning the flooring of a Neolithic longhouse comes from Jablines in France; this case is also not without its problems, however; the surface that is preserved is located outside the structure (Bickle 2013: 155).

Since these floors have not survived, there is also no information concerning either the functioning of their interiors or about their furnishings. One exception, however, for example, is a large silo with a completely preserved storage vessel in the interior ground plan in Bylany (*Figure 4*). The possibility that domestic animals

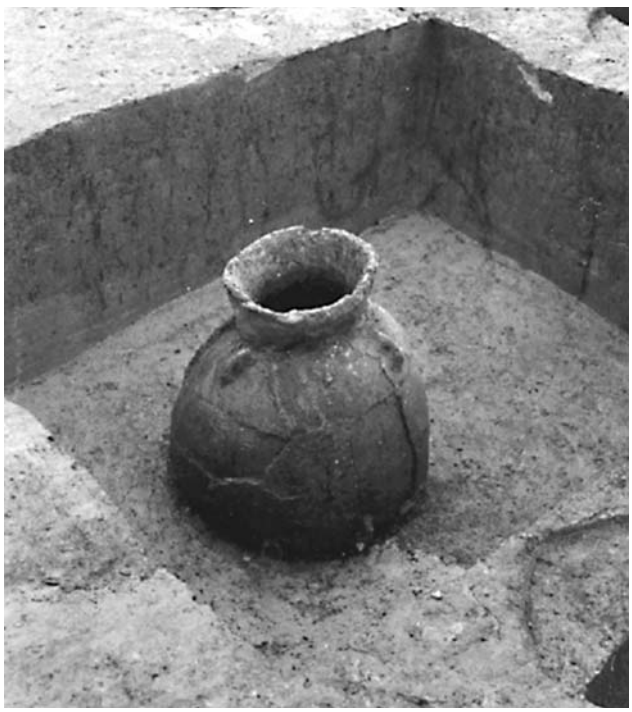

FIGURE 4. Storage vessel found at Bylany in the feature 125 inside the ground plan of house 96.

were stabled inside the building has been checked several times by analysing the organic and phosphate content of the building (Stäuble, Lüning 1999). This variant interpretation was not confirmed, however, at either at the Olszanica site nor at Hienheim (Bakels 1978: 75, Milisauskas 1972, 1976, Whittle 1992: 81).

Most of the information concerning the possible activities taking place in the house and its surroundings comes therefore from the external loam pits that flank the long walls of the building (Bickle 2013: 155, Whittle 1996: 163). These pits are believed to have been created during the construction stage, when they were the source of the clay for the wattle and daub walls (Modderman 1988: 92). It is based on the archaeological findings from these pits (especially the ceramics) that the settlement models were created and that the internal chronology was ascertained. The basic premise of the direct relationship between the findings in the pits adjacent to the structures and the original activities of their inhabitants links the otherwise somewhat varied interpretations of such sites as Bylany (Pavlů *et al.* 1986), Elsloo and Stein (Modderman 1970) and the sites on the Aldenhovener Platte (Boelicke *et al.* 1997, Lüning 1988).

Recently published works point to a much more complex relationship between the objects found in the pits and the activities taking place inside and in the vicinity of the residential structures. In any case, it appears that the origins of the archaeological findings in the pits cannot be generalised (Květina, Končelová 2011). While some works, primarily those in regard to the French environment, suggest that because of the mixed slaughter ages represented in the animal bone assemblages and the antler finds, the pits were active over the short-term, but not much longer (Bickle 2013: 156, Hachem 2000, 2011: 181–184), while other studies find that concept problematical. This mainly involves doubts that the findings from the pits in the vicinity of the house are the result of discarding activities occurring in this same house (Květina 2010a, Stäuble 1997). It is likely that the pits were filled with both settlement refuse from around the house, together with natural runoff. It also seems that, at least in some cases, the dynamics of refuse management were different for various kinds of articles and also that the deposition site might have been object-specific (Květina 2010a). These complex principles of refuse management in the area of the Neolithic settlement are also indirectly supported by ethnoarchaeological research works (Hayden, Cannon 1983).

There is no doubt that, both from the economic and the subsistence perspective, it was the longhouses that created the structure of the original area of the living settlement. In the course of the many large-scale excavations initiated during the 1950's and the 1960's it was soon recognised that the apparent large size of a settlement, with its wide range of structural ground-plans was simply illusory (Whittle 1996: 166). Only a few of the buildings were ever actually synchronous and in many cases this involved the spatial redisposition of a single house (Last 1998). Two theoretical models depict the hypothetical appearance of the Neolithic settlement as a social whole. The first is based on the concept of an integral settlement with a population of descendants (Soudský 1962). The second model conceives of Neolithic settlements consisting of individual farmsteads (ward model, *hofplatz*) that either stood alone or in a loose agglomeration with others (Lüning 1988: 69). Based on a reinterpretation of the research results from Aldenhovener Platte (Germany), an additional model was recently formulated (the row settlement model or *Zielensiedlungsmodel*). Its author assumes that the Neolithic settlement here had the appearance of a sequentially developed row of houses, always comprising one markedly longer structure (Rück 2007).

The explanation of the periodic relocation of the houses and the absence of their reconstruction has its own theoretical development (Bradley 1996). The key to this interpretation is their conspicuous similarity to the Danubian Neolithic longhouses, with their earthen long barrows and megalithic tombs (Midgley 2005). The apparent formal similarity between the shapes and the ground plans of the Neolithic houses and the megalithic passage graves and chamber graves (TRB and Cerny Culture) led to the idea of the identical conceptual background of both these phenomena. The fundamental concept behind this interpretation is the notion of the transformation of the house from a dwelling for the living to a dwelling for the deceased ancestors (Pavlů 2000: 238). How the idea of this transformation progressed from the east to the west of Europe and how the change of context from settlement to burial came about still remains open, however.

ETHNOGRAPHIC EXAMPLES – REVISITED

Archaeologists very soon discovered one of the possible ways in which to recreate an image of the original form and function of Neolithic longhouses. The solution was to use ethnographic analogies based on the concept that associated with the comparable material

remains in the archaeological and ethnological contexts there may be similar behavioural activities. Although the premise smacks of a somewhat diffusionistic style of thinking, in principle, it was an inspirational idea. The problem was that the authors generally did not restrict themselves to an actual comparison of the patterns of the material culture, but because they were impressed by the quantity of metadata of the ethnographic world they also overloaded their archaeological interpretations with these data.

Several stages can be traced back in the history of ethnographic analogy in archaeology (Trigger 1989: 300, Wylie 2002). It should be borne in mind, however, that the reported episodes of its development are almost exclusively tied to the transatlantic Anglophone world. The initial concept of linking the similarities between the living world of folk cultures to the prehistoric ones had its supporters on both sides of the Atlantic, however. The American archaeologist J. W. Sollas, for example, identified direct analogies between the individual Palaeolithic cultures and specific recent hunter-gatherer societies (1924). The reconstruction of a Neolithic house, that the German author A. Stieren presented in his work, was inspired by the traditional village architecture of the area (1934: 99) (*Figure 2*).

The earliest least "scientific" stage was the period that ended sometime in the 1960's. During that time researchers were actually simply inspired by images from ethnographic books and on the basis of these they were creating their own prehistoric parallel worlds (Blackwood 1950, Heider 1967). The recent archaic populations were historically regarded as living relics, i.e. as populations that remained at an evolutionary level that roughly corresponded to the classical archaeological periodisation (Gosden 1999). In this sense the fixed concept of a unilinear evolution stuck to archaeologists like glue. The following period was associated with emerging efforts to bring archaeology closer to being an exact science. At the same time, a number of scholars began to openly refer to the currently existing or the recently defunct archaic societies and look to them not just for inspiration but also for the answers to very specific questions. A classic example is the work of Lewis Binford (1967), who in his field research of prehistoric sites of American Midwest encountered pits, the content of which was made up almost entirely of clinker. In searching for the purpose of these objects he used information derived from the environment of the indigenous peoples of the area. He found out that they used similar pits for drying and preserving deer leather through the use of smoke. In this manner Binford defined his approach, based on testing hypotheses formulated on the basis of ethnoarchaeological data. A number of American archaeologists followed this proposed route, who, unfortunately rather than using simple economic or ethnoarchaeological subsistence models tried to adhere to the complex and barely conceptualised social rules of the societies that they studied (Longacre 1970). A typical example was the concept of the matrilocal transference of knowledge and experience of the manufacture of ceramics, which was supposedly reflected archaeologically in the residential settlement patterns of the Native American pueblos (Deetz 1965, Hill 1970). This controversial approach encountered criticism, which then drew attention, for example, to the absolute omission of consideration of the definable formative processes of the archaeological material (Schiffer 1989).

Later, in relation with the establishment of a new paradigm, a revision took place of the basic principle of the utilisation of ethnological parallels and of the fact that the causes of similar manifestations of material culture are similar patterns of activity (whether economic, subsistent, social, etc.). For the first time human behaviour was being viewed as a highly complex topic, one for which there is actually no possibility of making a straightforward comparison across different cultural spectrums without taking into account the very broad range of additional circumstances. Interpretation and prediction of the behaviour of extinct cultures based on analogies with the world's recent archaic societies were repeatedly being questioned at that time (e.g. Hodder 1978). Ethnological analogies did not receive a fatal blow in the 1980's, however. Rather, everybody learned to understand that in addition to the manner of livelihood, the natural environment, the climate and the other "hard" parameters, it is necessary when making comparisons to also consider difficult-to-grasp symbols (Sabloff 1981). The theoretical debate on dealing with ethnological comparisons in archaeology is far from being closed, however (Nichols *et al.* 2003, Schiffer 2011). Also because, in the end, it is actually concerned with a comprehensive approach to the study of human beings and of their archaic culture, regardless of its precise dating.

And how is this applicable to ethnographic data in regard to the longhouses of the Danubian Neolithic period? First of all, it does not appear that the use of this comparative approach underwent any clearly directed evolution in the archaeology of Central Europe. Cultural ethnographic analogies appear in the original, and now already classic, literature, even if they are not precisely specified and most frequently simply serve as illustrative

examples (Milisauskas 1972: 73, Soudský 1966). On the contrary, in completely up-to-date works virtually nobody follows this path in regard to the reconstruction of Neolithic residential buildings (Bickle 2013, Hofmann, Bickle 2009) and if they do, they are not primarily archeologically focused (Waterson 2013). The question is whether this situation indicates a significant transformation in the field of continental archaeological theory and interpretation, or whether it is rather evidence of the indifference of the professional community to this topic. There is currently no clear concept of working with ethnographic examples in Europe and therefore, in some aspects, it is stalled either at the level of the generalised analogies of the 1990's (Whittle 1992: 81, 1996: 165–166) or it remains in the stage of stubborn denial of the 1980's (Wylie 1985). Standing out from this grey trend, however, is the knowledgeable application of an ethnographic informational trend factor, which describes, for example, the work of A. Coudart (1998).

Perhaps the problem lies in the fact that nowhere in the study of archaeological resources can we find any attempt to define the rules for the utilisation of ethnological information. If we attempted to formulate them, we should primarily insist on not taking specifics out of the context of the complex structure of a specific cultural habitus. We should certainly reflect the current state of information concerning the specific themes being researched in the field of anthropology, including shifts in theoretical concepts. The last, but perhaps the most important, criterion is the assessment of the overall comparability of the planes of reference utilised, e.g. in terms of the climate, the environment, the economy and settlement patterns. And this is where we run into the problem that debunks the concept of defining any fixed rules for the utilisation of ethnographic analogies in archaeology. This problem, naturally, presents a difficulty in tackling unawareness of the requisite parameters of the archaeological material that is being studied. On a more general and less detailed level, this problem is solvable and the rule is self-evident: an interpretation of Neolithic settlements cannot be based on a comparison with Inuit hunting camps. But the more that we go into depth, the more we encounter uncertainties in regard to archaeological knowledge, which should constitute the initial criteria for decision making in regard to the utilisation of ethnographic analogies. The fact that in respect to Neolithic farmers we assume seasonally unconditional settlement and residential status does not necessarily mean that it really was like this. Is it therefore possible to compare the LBK Culture, in terms of its manner of subsistence, with the Mexican Rarámuri (Graham 1994)?

Despite the sceptical view expressed concerning the possibility of a meaningful definition of the fixed boundaries of the anthropological-archaeological comparison of information, ethnographic analogies cannot be summarily dismissed. When we do that, there is a risk that we will throw the baby out with the bathwater. Whereas instructions for the use of ethnographic parallels have already been offered to us by L. Binford, i.e. that analogies are simply a source of hypotheses that can and must be tested archaeologically (Binford, Quimby 1972: 33–51). However, to attempt to do so in the case of Neolithic longhouses, it is necessary to gather a sufficient quantity of currently valid information relating to such building structures sourced from the ethnographic environment, while, at the same time, defining their existence within the structure of the entire culture that is being studied (Coudart 1998).

EXAMPLES OF RECENT LONGHOUSE SOCIETIES AND OF THEIR SETTLEMENT STRUCTURES

In this section we will show examples of three types of longhouses from the sphere of different archaic societies whose members have built these types of dwellings and lived in them in recent times. The selection of examples may seem eclectic and to some extent it also is so. An important criterion for inclusion was a sufficient amount of information concerning the construction and the residential details of these buildings. This included not only ethnographical data (i.e. information obtained by the historical or contemporary observation of living communities), but also archaeological information. In contrast to the situation 50 years ago, during the last period during which ethnographic analogy to Neolithic houses was "popular", they represent sources of archaeological knowledge that also enable a qualitatively different perspective concerning the ethnographic context of longhouses. The result of archaeological field exploration of recent sites provides information that is missing from ethnographic sources. They include, for example, the preservation of the structural elements in archaeological records, the period of existence of individual buildings, changes in residential structure over time within a region or also within a single settlement. Secondarily the selection of the examples presented was influenced by additional parameters, such as the type of environment and the character of the specific society.

The first example presented is of the massively large residential buildings of the cultural circuit of the Pacific

Northwest coast of North America. Although these were populations with an economy focused exclusively on hunting and gathering, we do not consider this cultural environment as an irrelevant analogy. It was the intensive hunting and gathering in an environment rich in natural resources that brought the local society to sedentarisation and to a complexity rather more typical of productive populations.

The second ethnographic example is represented by the population inhabiting the forested north-eastern part of the current U.S., commonly known as the Iroquois. This society, in terms of its agricultural economy in association with a hunter-gatherer society, was obviously strongly connected to its long abodes, since they symbolically identified themselves "The People of the Longhouse".

The third and geographically widespread sphere of existence of longhouses is in Indonesia. Unlike in the case of the American examples, the large longhouses continue to be a standard feature of the local residential architecture. The more extensive, therefore, is the amount of information concerning the construction of these buildings that it is easily possible to connect with their cultural significance.

1st example: the Chinook from the Northwest Coast

On the territory between northern California and Alaska, in the period prior to European contact, there existed a culturally homogeneous area defined as the Northwest Coast of North America. In terms of its linguistic breakdown we can distinguish a number of groups within this geographic area. The south was inhabited mostly by the Salish and the Chinook (Nabokov, Easton 1989: 227–228). The local population benefited economically from the rich natural resources, so that although, de facto, they remained hunter-gatherers they reached an advanced stage of social complexity. Culture settings also comprise a feature of the typical aggregate of the local material culture: longhouses constructed from planks (i.e. a plankhouse) (*Figure 5*). These houses and the households living in them represented the basic social unit in the region, as was documented by European travellers in the 18th and 19th centuries (Ames *et al.* 1992: 276). This type of house, however, can be up to 4000 years old (Ames 1996: 135) and it is likely that it developed from an earlier type of sunken dwelling (a pit-house) (Ames 1996: 140, Matson 1992).

We shall deal in detail with the houses of the Chinook population and specifically with the building at the Meier archaeological site (Ames *et al.* 1992). This place is

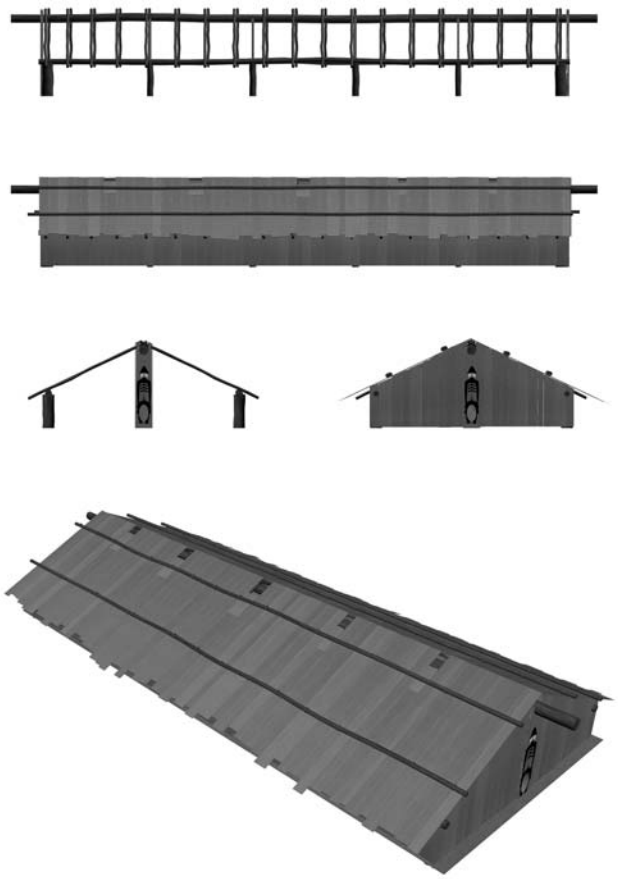

FIGURE 5. Virtual reconstruction of the Chinookan plankhouse at the Meier site. Illustration by V. Hrnčíř.

located in the state of Oregon, in the valley of Wapato, on the lower Columbia River and its biological and climatic characteristics constitute a typical example of the environment of the entire Northwest Coast. Along the river valley there are forests mainly comprising deciduous trees while in the foothills coniferous forests are prevalent. The area has a humid climate with a low summer rainfall (Hansen 1941: 209, Sprague, Hansen 1946: 89). The climate is relatively mild throughout the year and is characterised by cool, wet winters and warm, dry summers. Most of the precipitation falls between November and March. The average annual rainfall is ca. 1000 mm. The difference between the maximum and minimum seasonal temperatures ranges from 1°C in January to 27°C in August. Extreme temperatures are rare. Snow falls almost every year; its quantity is relatively small, however. The growing season is long so that all the vegetation thrives extraordinarily well (Taylor 2010).

The most important economic, social and political unit for the Chinook was the household. Its size ranged between twenty and more than a hundred people. Each household dwelt in a large plankhouse that could have an area ranging between 90 m^2 and over 1000 m^2 (Ames *et al.* 1999: 14). The number of houses in a village ranged between 1 and 28, although not all had to be occupied simultaneously (Hibbs, Ellis 1988: 48). This has to do with fact that the Chinook generally had two types of settlements: permanent winter and temporary summer quarters (Silverstein 1990: 537–538), though some sites were probably inhabited year-round.

The house was owned by a household. Due to the relocation of settlements in accordance with the season, however, this dwelling unit might own more houses, either completed ones or just "semi-finished products" in the form of wooden frames, that before they could be made habitable, needed to be covered by planks. This is to say that the planks were not necessarily tied to just one construction and could be transported by water to another site in the form of rafts. Based on normal maintenance the actual frames of the houses could last for an incredibly long time (Ames 1996: 141). This is very well illustrated by a construction on the Meier site that was used continuously for 400 years (Ames *et al.* 1992: 287)!

Chinook plankhouses had rectangular floor plans and gable roofs. The long axis of the house usually lay parallel to the direction of the prevailing winds (Ray 1938: 124). The basic structural component of the building was its frame, consisting of three rows of sturdy poles with horizontal beams, which were then covered with planks (Ames *et al.* 1992: 276–278). The main building material was very durable timber from giant cedar (*Thuja plicata*) (Ames *et al.* 1992: 286). The ropes used for tying were made either from cedar bark (Hibbs, Ellis 1988: 48) or from spruce or cedar roots (Ray 1938: 124). Tree trunks served as massive supporting poles, while the trunks or larger branches of smaller trees were used for making smaller poles. Boards were prepared either from still standing trees or from chopped logs (Ames *et al.* 1992: 286). The carpentry tools commonly used by the Chinook included stone maces and hoes and wedges and chisels made of bone, antlers, shells or beaver teeth (Ames 1996: 145).

The construction details and the sizes of the individual houses varied. Typically their sizes ranged between 6 and 15 m in length and 4.5 and 9 m in width. Several extremely longhouses with a length of between 60 and 137 m have also been documented, however (Ames *et al.* 1992: 277–278). The building at the Meier site that was specifically explored archaeologically was 35 m long and 14 m wide, i.e. somewhat larger than a typical house (Ames *et al.* 1992: 275). The long axis of this building was oriented roughly in a N-S direction (Ames *et al.* 1992: 285). Construction of the frame of the house always commenced with levelling the terrain, then pits were dug for the central poles that would bear the ridge. Stones were then placed at the bottom of the postholes that served not only to ensure the stability of the inserted pole, but also provided some drainage, thereby prolonging the life of the wood (Ames *et al.* 1992: 280–281, 286). The central poles were evenly spaced in the pit about 6 m apart. Their height was between 5 and 6 m and each had a notch at the top. The ridge beam, which often extended over the edges of the gables, was laid in these notches. Subsequently 1.5–2 m high support columns were erected along the sides, the number and distribution of which corresponded with that of the central poles. Tied to these were two eave poles. Finally the rafters were installed, ca. 1 m apart (Ray 1938: 124). Since the house at the Meier site had existed at the same location for circa 400 years, the individual parts of the frame had needed to be replaced several times. Archaeologically documented are 5 to 11 reconstructions, relating to specific parts of the frame. When taking into account the expected lifetime of giant cedar timber, it can be estimated that all the parts of the frame were replaced every 20 years. For the entire period of its existence the house was rebuilt piece by piece ca. twenty times (Ames *et al.* 1992: 287).

The walls of the houses were made from planks, which were bored vertically to the ground and the upper edges of which were tied to the eave poles. Their cross-section was of a thickness of 2–6 cm and 30–100 cm in width (Ames *et al.* 1992: 278–279, Ray 1938: 124).

The roof consisted of similar but thinner planks that were placed either horizontally or vertically. The roof was probably single-layered. They are, however, buildings that had a double-layer roof, whereby one layer of planks is laid parallel to the long axis of the house and the second layer perpendicular to it (Silverstein 1990: 538). On one hand this increases the water resistance but on the other hand, at the same time, it doubles the amount of wood needed (Ames 1996: 141). Therefore a monolayer roof could sometimes have overlapping grooves (Ray 1938: 124) or it could be covered with cedar bark (Ames *et al.* 1992: 278). Since fireplaces were located inside the house above each of these there was an opening in the roof created by using either shortened or loose planks that were easily movable (Ray 1938: 125).

The floor of the house at the Meier site was made of planks, but in some phases of its construction it had

probably consisted only of a clay that could be covered with cedar or reed mats (Ames *et al.* 1992: 278, 283, 286, Ray 1938: 125).

In terms of its functional and spatial layout the interior of a Northwest Coast longhouse can be divided into several zones: the central and the rear parts, platforms and cellars (Ames *et al.* 1992: 278).

In the central part of the house, between the ridge supports, four or five fireplaces were located ca. 30 cm below the floor level inside square timber-enclosed hearth boxes with a size of 2–3 m^2 (Ames *et al.* 1992: 278–280, Ray 1938: 125).

The rear part of the building was probably reserved for the highest-ranking family. This area could, in some cases, therefore be separated with a curtain or a partition with painted and carved wooden or stone figures (Ames *et al.* 1992: 279). These partitions constituted a number of planks, similarly to the walls, but they did not exceed them in height. They always ran across the house, never lengthwise, and rarely was there more than one (Ray 1938: 125).

Platforms were a type of plank bench that lined at least two sides of the house (the side walls and possibly also a rear wall). They were usually 1.2–2 m wide and were used for sleeping and for other activities (Ames *et al.* 1992: 278, 281). The spaces below them were used for storing supplies and tools. Sometimes they could be raised vertically to function as a bunk bed. Platforms were formed using smaller vertical poles with a diameter of up to 10 cm, which ran parallel to the walls and were tied to the rafters above. They were attached to the beams of the eave poles using horizontal bars, which were about half a metre above the ground. Horizontal planks were then placed over these bars (Ray 1938: 125).

The cellar consisted of a 2–3 m wide and 1.5 to 1.9 m deep irregular excavation between the platform and the central zone, ca. 2–2.5 m away from the side-walls (Ames *et al.* 1992: 279, 281–283). It actually constituted a series of pits, above which there was a plank floor. These pits were more or less uniform in their shape – flat walls, a flat base, a depth of ca. 1 m and a diameter of ca. 85 cm. Typically they were sunk 20–50 cm into the ground. The cellars were used to store tools, food and other assets (Smith 2000).

Although the house at the Meier site was probably inhabited year-round (Ames 1996: 145), most of the longhouses of the Northwest Coast were inhabited only in the winter. The buildings were dismantled in the spring so that only remaining were the pole frames (Ray 1938: 126). During warm seasons the Chinook utilised summer villages that served as fishing, hunting and gathering camps. The dwellings there took the form of a light wooden frame covered with mat walls and bark roofs (Silverstein 1990: 538).

One of the main functions of the plankhouse was the use of its interior for processing and storing food. Animals were slaughtered inside the house, including such large creatures as elk (*wapiti*) and sea lions. It is known from the ethnographic records that food intended for drying was hung on the rafters, that the platforms along the walls were filled with storage boxes, and that other supplies were stored in baskets in the interior and in the cellars (Ames 1996: 134, 145–146). Also, numerous large heated areas in the house were preferentially used for the bulk processing of food (read: the creation of long-term reserves) and only secondarily were they were used for cooking by nuclear families (Smith, Ames 1998). A usual number of residents in the house is estimated as about 60 people, depending on seasonal and other factors. Because two Chinook families commonly shared one fireplace, 8–11 families could live in one house (Ames *et al.* 1992: 279). The varying sizes of the individual longhouses represented the profound differences in wealth and status existing amongst the Chinook communities.

2nd example: the Iroquois from the Great Lakes

Other indigenous populations of North America that also built longhouses were tribes that were living in the eastern part of the continent and known as the Iroquois (Bamann *et al.* 1992: 435).

The Iroquois and their related populations (Huron, Petun, Neutral and Erie) inhabited areas lying adjacent to each other that had similar geomorphological and environmental conditions, primarily in today's New York State (Bamann *et al.* 1992: 436, Kapches 1993: 175, Morgan 1881: 31). To the north the region was bounded by the Adirondack Mountains, Lake Ontario and Lake Champlain; on the east by the Hudson River with the Genesee River to the west and in the south by the upper flow of the Susquehanna River. It was primarily a landscape of lakes and hills divided by numerous rivers (Reid 1996: 1). The average altitude was 300 m asl and the highest point was the 1629 metre high Mount Marcy in the Adirondack Mountains to the northeast. The dominant landscape feature was the Mohawk River, with its adjacent valleys, running through the entire area from west to east and thereby providing a natural communication link (Foley 1975: 3). The area held high-quality agricultural land rich in minerals. Also contributing to favourable agricultural conditions were the ample rainfall and a long frost-free period. The

average annual rainfall was ca. 1000 mm, with the largest shares in the winter and the spring. During the summer, however, the rainfall was insufficient and the area was repeatedly affected by short periods of drought (Thompson 1966: 91). In terms of climatic taxonomy the entire region was located in the temperate zone. The summers were hot and humid, with daytime temperatures ranging between 25 and 30°C while the autumns were moderate. On the other hand the nature of the cold and wet winters was very onerous, because cold winds from the interior were bringing with them adverse freezing temperatures and significant snowfall. Mild spring weather and the associated melting of the snow created the conditions for frequent flooding, which fertilised the soil (Foley 1975: 5–6).

From the subsistence point of view the Iroquois were simultaneously both hunter-gatherers and farmers. Using slash-and-burn of the vegetation they undertook a limited amount of gardening, in which the main roles were played by corn, beans, squash and tobacco (Reid 1996: 3). In addition they fished and hunted the forest animals and gathered berries, plants and roots.

During most of the year the Iroquois lived in gated villages (Morgan 1881: 112). These constituted 20 to 100 longhouses, and were located in close proximity to streams or lakes, on terraces that were surrounded by vegetable gardens, orchards and cornfields often covering several hundred acres (Lyford 1945: 11). The population of the villages was generally between 300 and 600 (Reid 1996: 2) and only in a few of them did more than a thousand people live (Foley 1975: 6). Until the end of the 17th century these were surrounded by one or two rows of palisades erected to protect the population from attack by enemies (Lyford 1945: 11). The orientation of the houses within the palisade probably corresponded to the prevailing wind direction. However, this was certainly neither the only nor the major factor. Amongst others, for example, were the amount of free space, the internal organisation of the settlement, microclimatic phenomena, the degree of slope, etc. (Engelbrecht 2002: 74).

As a settlement unit the Iroquois village was a cyclical phenomenon because approximately every 10 years it moved to a different location (Foley 1975: 7). This was initiated when the soil fertility of the fields declined, the firewood near the village was depleted or the longhouses began to fall apart (Lyford 1945: 11). The abandonment of the settlement was a relatively slow process, however, because the old location was abandoned only gradually as the new village was being constructed (Reid 1996: 2).

The typical dwelling unit of the Iroquois was the longhouse (*Figure 6*) inhabited by between five and twenty families (Morgan 1881: 15). The house had a rectangular floor plan (Lyford 1945: 11), originally more likely with rounded and later on with square corners (Engelbrecht 2002: 73). The length of the house mostly ranged between 10 and 30 m, the width from 4.5–8 m and the height from 4.5–6 m (Lyford 1945: 11). Although on average the house was 24 m long, in some cases, it exceeded a length of 60 m and the longest measured more than 120 m (Engelbrecht 2002: 70, Reid 1996: 2). It seems likely that the length of the longhouse did not reflect only the number of its inhabitants, but also the power, authority and prestige of the clan. The longest house in the village evidently belonged to the chief and his kinship line (Kapches 1993: 156). As regards additional dimensional data, also interesting is the evidence provided by travellers who observed that the height of the house also matched its width (e.g. Thwaites

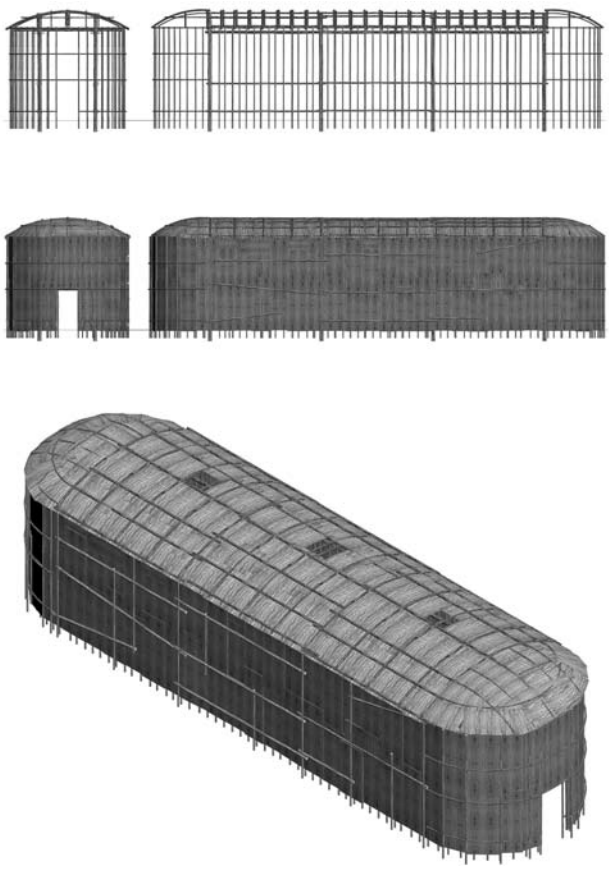

FIGURE 6. Virtual reconstruction of the Iroquois longhouse. Illustration by V. Hrnčíř.

1896–1901: 105–107). Structurally, the longhouse consisted of a strong frame of upright poles buried in the ground, which were reinforced with horizontal bars and bridged by a triangular or rounded roof. The entire structure was covered with large strips of tree bark (Morgan 1881: 112).

Iroquois longhouses were, in any case, impressive buildings, so it is not surprising that they attracted the attention of the first European travellers, soldiers and missionaries (e.g. Bartram, Kalm 1751, Biggar 1922–1936, Lafitau 1724, Thwaites 1896–1901, Wrong 1939), from whose records we obtained the first descriptions and drawings of these buildings. They also enjoyed the great interest of classical anthropologists and ethnographers, of whom we should at least mention Lewis H. Morgan (1881). Despite this early and intense interest, however, many of the technical and social parameters of these buildings remained unknown. For this reason archaeological research of recent Iroquois settlements commenced after the middle of the 20th century (Kenyon 1968, Ritchie, Funk 1973, Tuck 1971, Wright 1974). Based on archaeological and ethnographic evidence it is possible to ascertain that the Iroquois tended to associate in larger households not later than by the year 1000 AD (Bamann *et al.* 1992: 435, Hart 2000: 17, Kapches 2007: 185). Roughly by the year 1300 AD classic Iroquois longhouses appeared that, on average, were 7.5 m wide and 24 m long (Hart 2000: 17, Reid 1996: 2). The Iroquois lived in these until changes caused by contact with European civilisation occurred from around the year 1700 AD and in some cases even till well over 100 years later (Morgan 1881: 63). In the subsequent period longhouses were replaced by smaller, about 6 m long, single-family dwellings (Lyford 1945: 13).

Despite a number of contemporary descriptions and illustrations the construction of the frame and of the roof of the longhouse remains unclear. On the basis of recent archaeological findings, construction based on the π-frame can be regarded as probable, which is a structural unit consisting of two large vertical poles, approximately 3 m apart, which support a horizontal beam, the ends of which extend 1.5 m beyond the vertical poles on each side (Wright 1995: 10–12). A row of these π-frames ran along the entire length of the house and thereby represented the basic frame of the house, bearing the main load, to which the rafters, walls and side beams were then attached. These internal support poles, which were 13–20 cm in diameter (Kapches 2007: 180), were placed into pre-dug pits where they were sometimes secured by stone wedges (Engelbrecht 2002: 71), and, like the walls, they reached almost 5 m above the ground.

The outer walls were made up of alternating series of vertical stakes buried in the ground (Engelbrecht 2002: 76). At the top they were attached to the longitudinal eave poles that were attached to the ends of the transverse beams of the π-frame (Wright 1995: 12). The wall poles had a diameter of 5–7.5 cm (Kapches 2007: 180) and were recessed 30–60 cm into the ground (Nabokov, Easton 1989: 78, Wright 1995: 12). It is estimated that there would have to be five such stakes for each metre of the wall (Wright 1995: 15). To hold more securely, they were reinforced with several rows of horizontal bars (Morgan 1881: 112). According to iconographic sources, the ratio of the walls to the roofs is defined as 4:1. The roof was either triangular or rounded in shape and was formed by thin, flexible rods bent toward the centre (Lyford 1945: 11), with their lower ends attached to the eave poles (Wright 1995: 11–12, 14). Tied to the resulting pole frame were large, more than a metre wide and 2–2.5 m long, strips of bark. The bark was straightened and shaped by heat or by soaking in water (Steckley 1987: 30).

The individual sheets of bark were tied together and overlapped in the manner of shingles. Holes for binding were made in the bark using a perforator made from bones (Lyford 1945: 11). Externally, on the roof and on the walls, bars were also installed over strips of bark and lashed to the inner row of stakes to more effectively secure the bark in place (Morgan 1881: 112). The bark was laid with its inner side down so that its fibre was oriented in a vertical direction and this helped to divert rainwater away from the building (Kapches 2007: 180).

The Iroquois longhouse had no windows. Light entered through the tall and wide doors on both sides and from above through the flue openings (Lyford 1945: 12). A moveable piece of bark or of tanned leather served as the door. A square hole in the roof above each fireplace allowed the smoke to escape and light to enter. Moveable pieces of bark were attached in the vicinity of these holes for the purpose of covering them in the event of bad weather. They were manipulated from inside using a long pole. At both ends of the house there were open spaces, called vestibules, that were used for storage (Wright 1995: 14–16). From these a second internal entrance led to the central corridor. This corridor was 2–3 m wide (Lyford 1945: 12) and ran longitudinally through the entire longhouse apart from the terminal vestibules. It was defined by pairs of stakes running through the interior of the π-frame, which also served for the attaching of 1.5 m wide platforms that were located along both walls of the house and that were used for sleeping. Along their entire length these platforms were divided into sections that

defined the sleeping quarters therefore represented a kind of family room (Morgan 1881: 112). These were usually about 6 m long (Engelbrecht 2002: 77) and apparently were defined by individual pairs of π-frames, but there are also references of shorter versions, only 2–3.5 m long (Lyford 1945: 12, Morgan 1881: 112). The rooms could be separated by using leather or bark (Bartram, Kalm 1751: 41) on order to provide sufficient privacy at night. Towards the corridor, however, they remained completely open (Morgan 1881: 112). This manner of the division of the interior into rooms and a central corridor is found only in buildings owned by Iroquois belonging to the League; this has not been documented in respect of the Ontario Iroquois (Kapches 2007: 177).

Located in the corridors, always between two rooms, were central fireplaces, built of stones and each used by two families (Wright 1995: 16). Depending on the size of the house, they could number as many as 12 in one building (Lyford 1945: 13).

As mentioned above, the longevity of the village settlements and therefore also of the individual houses was 10–15 years. It could, however, be longer, even as many as 30 years, as was the case in regard to the Chinook houses on the Northwest Coast, due to the high degree of durability of cedar wood. In the event that it became necessary to expand the house because of the increasing number of its inhabitants, this was always carried out lengthwise (Kapches 2007: 180–181).

The Iroquois longhouse was most intensively occupied from the autumn to the spring, during which period most of the social and sacral activities were taking place there (Kapches 2007: 176). During the warmer summer months, it was used less intensively, when the women and children left the restricted area of the building to cultivate the surrounding fields and lived in less formal structures, such as the small cottages or outbuildings. During this same period the men frequently traded or hunted outside the village.

The fact was that the houses did not serve their inhabitants solely for housing. A wide range of activities took place there, including sleeping, the storing and preparation of food, the storing tools and materials, manufacturing and repairing objects in addition to births, deaths, ceremonies and political meetings (Kapches 2007: 177). The longhouses had a nonspecific-function interior (Kapches 1990: 49), which means that a wide range of activities were carried anywhere inside the house and there were no specifically designated areas except, perhaps, for the terminal vestibules.

Of all the recent populations that included longhouses in their cultural package, it was probably the Iroquois who appreciated the symbolism that this manner of construction expresses to the greatest extent. Additionally it was they themselves who awarded the longhouse the role of an iconic element of their own cultural identity (Foley 1975: 30, Kapches 2007: 174, Nabokov, Easton 1989: 76). The members of the Iroquois League even stylised themselves as "People of the Longhouse" (*Ho-de'-no-sau-nee*) and made the longhouse (*Ho-de'-no-sote*) the specific symbol of the League (Morgan 1881: 39).

3rd example: the Ibans from Borneo

Longhouses are still a common living feature of the cultural reality of Southeast Asia. Especially in present-day Indonesia, longhouses are found relatively frequently in different cultural contexts. An interesting feature, in which they differ from the American examples described above, is the location of the living floor that, rather than being at ground level is on a raised platform. A well-known example of these types of structures is the area of New Guinea where there is a wide range of diverse large-scale residential buildings (*Figure 7*), often with areas separated according to gender (Metcalf 2010: 32).

Longhouses with a raised floor are also very common in Borneo (e.g. the Kayan, the Kenyah, the Kajang and the Dayaks; Alexander 2006: 32–35, Helliwell 2006: 45–47). The largest of these structures may contain hundreds of households and reach a length of up to 800 metres (Metcalf 2010: 38). The indigenous peoples of this island also include a population known as the Ibans (formerly described as Sea Dayaks) living mainly in the State of Sarawak (Sutlive, Beierle 1995: 2), whose houses we will describe here in closer detail (*Figure 8*).

The Iban territory lies in the tropics, and its climate is characterised by significantly heavy rains, consistently high temperatures and high relative humidity (Jensen 1974: 8–10, Kedit 1980: 19–20). In the lowland regions, the temperature ranges from 22 to 31°C, with an average daily temperature of 26°C. The rainfall is very heavy, with an average annual total, depending on the area, of between 2600–4000 mm. The most abundant rainfall, up to 200 mm daily, is between November and January and is brought by monsoons from the northeast. The landscape on the coast is lowland, frequently marshy and is intersected by river valleys. Towards the interior the terrain rises gradually to the hilly uplands, where the tropical rain forest commences, which reaches to the mountainous inland areas. The Sarawak area is intersected by many rivers and streams that both provide water and constitute the primary means of

Longhouse of the Asmat (Ajam village).

Asmat settlement (Binerbis village).

The inside of the Asmat longhouse (Awok village).

Tree house of the Korowai.

FIGURE 7. Examples of aboriginal longhouses from New Guinea. Photo by J. Rendek.

communication and, in the case of the Ibans, also define the individual tribal areas.

The Ibans inhabit the undulating woodland of the hilly zone and also part of the floodplain of the river deltas of Borneo. Naturally their settlements and their livelihood are very strongly influenced by the local climate, soil and vegetation (e.g. Jensen 1974: 10–11, Kedit 1980: 20–21, Padoch 1982: 37). The basic livelihood of the Ibans is dependent on rice planting (Freeman 1955a: 26–28, 32, Sutlive, Beierle 1995: 3–4). This is a cyclical form of cultivation, characterised by frequent switching of fields that are cleared by fire and by the absence of draft animals and of fertilisers. Fruits and vegetables are obtained from their own gardens next to their houses or by gathering them from the surrounding jungle. They obtain a sufficiency of protein by fishing and hunting. Almost every family also keeps poultry and pigs and sometimes cattle. There are always several dogs running around each house (Komanyi 1973: 61).

The flow of the river constitutes the axis of the internal structure of Iban society. Although its units were previously referred to as tribes, they rather constitute temporary allies, though these alliances are often relationally linked (Sutlive, Beierle 1995: 6). Each of these groups, represented by one longhouse, comprises the inhabitants of several separate villages that are ranged along the same river or river system and are usually 2–5 km apart from each other (Freeman 1955b: 27).

The form of Iban longhouses (*rumah panjai*) is very standardised: the building stands ca. 3 m above the

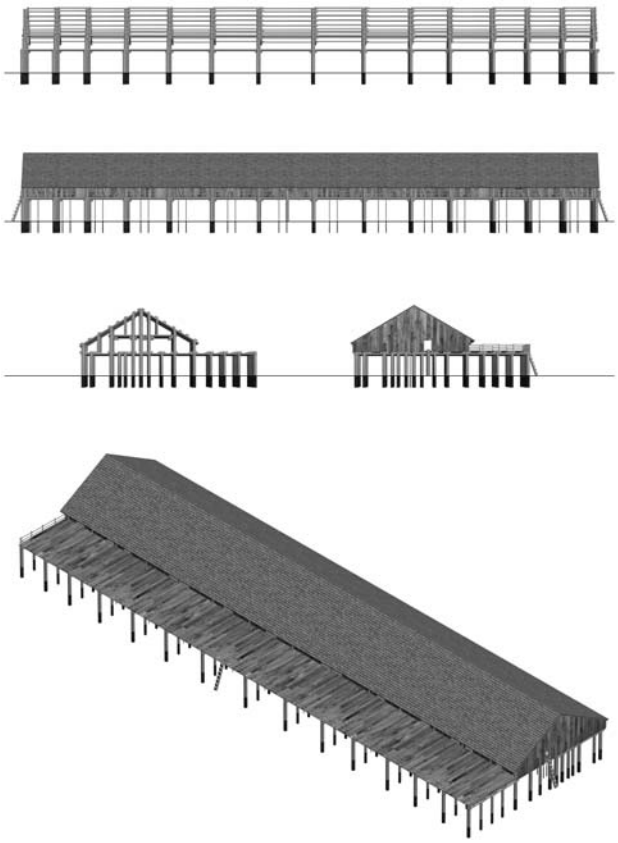

FIGURE 8. Virtual reconstruction of the Iban longhouse with 14 apartments. Illustration by V. Hrnčíř.

ground on stilts, usually on a terraced bank of a river or a stream (Freeman 1955b: 4–5, 26–27). Although technically it constitutes one building, in actuality it consists of a series of apartments, arranged side by side, usually belonging to families that are related to each other. The number of these residential units ranges between 2 and 80; most commonly, however, between 10 and 20 (Jensen 1974: 30, Sutlive, Beierle 1995: 2). The same term *bilik* (or *bilek*) refers to both a long, separate, closed room of the longhouse and to the family group that owns and occupies it. Usually it has 5 or 6 members and is two or three generational. Membership of it is acquired by birth, marriage, adoption or incorporation into the community. Because Iban society lacks a more defined organisational hierarchy, its basic social and economic unit is the *bilik* – in this case the family or the household (Freeman 1955a: 5–10, Sutlive, Beierle 1995: 5). It is responsible for the construction of its own apartment, the production of its own food and the management of its own internal affairs.

Returning again to the actual topic of the longhouse, let us repeat that it is a rectangular building standing on a large number of piles that provide a raised floor platform. The length of the house can range from a few dozen to three hundred metres (Sutlive, Beierle 1995: 2). The entire structure is actually formed by the combining of a number of family apartments, each of which is composed of several areas (a family room (*bilik*), a gallery (*ruai*), an attic (*sadau*) and an outdoor veranda (*tanju*)). The width of the roofed area, i.e. of the room and the gallery, is ca. 10–15 m; a linked veranda has additional 6–8 m (Freeman 1955b: 1, 27).

The basic constituents for the construction of the wooden frame are massive piles and beams, which withstand the tropical humidity very well (Metcalf 2010: 25). The floor is usually made of cut-up planks or of slats or bamboo rods (Low 1848: 169) on which mats are placed. The traditional roofing was comprised either of shingles or of thatch (Roth 1893: 27). The coupling materials are rattan ropes (*Calamus* spp.) or wooden pegs and pins (Roth 1893: 27, Sather 2006: 79). Since each family builds its own abode more or less by itself, it is not unusual for individual neighbouring apartments to vary significantly both in the diversity of the materials used and in the quality of their processing (Freeman 1955b: 1, 3, Sutlive, Beierle 1995: 2).

In ideal cases longhouses are oriented with their longer axis parallel to the watercourse. Consequently, the ends of the house, and thereby also its two halves, are usually distinguished as "upriver" (*ulu*) and "downriver" (*ili*). The second orientation is in relation to the movement of the sun across the sky. The basic concept is that the east-west direction of the sun's path must never coincide with the longitudinal axis of the house, so that the sun would shine only into one part of it or the other (Sather 2006: 76, 80–81).

First erected during the construction is the founding centre pole called *tiang pemun* and then the foundation poles for the individual family apartments (Sather 2006: 73, 76). The poles are 35–65 cm in diameter (Metcalf 2010: 35, Ting 2005: 6) and are embedded in pre-dug postholes up to 1.5 m in depth (Alexander 2006: 34). At the top they support the ridge beam, at a height that ranges between 8 and 16 m. After the installation of these, several side rows of poles are constructed, which though already slightly lower are still sturdy. All of these columns are then connected together and reinforced with transverse and longitudinal beams and together they constitute the frame of the entire building.

Following this comes the installation of the floor, which at the centre of the house is ca. 3–5 m above the ground (Freeman 1955b: 27). Depending on the slope of

the terrace this height may increase at the end of the house by up to 9 m. Exceptionally, it may also even have several levels. Most frequently it is made of cut-up planks, which are placed about 3 cm apart (Komanyi 1973: 50, 52). They are usually 30 to 50 cm wide and about 8 cm thick. Their length can be up to 18 m (Metcalf 2010: 36). The frame of the house also comprises a system of rafters and horizontal slats that carries a high gable roof (Freeman 1955b: 1–2). This, though it may in individual apartments be covered with various materials – usually with shingles or thatch – forms one large unbroken surface. The space under the roof is relatively clear so it provides the residents with a welcome reservoir of relatively cool air (Metcalf 2010: 44). Both the exterior and the interior walls are usually made of wooden planks. The inner walls, which separate the rooms, may sometimes also be made from bark (Roth 1893: 27).

The principal internal division of the longhouse comprises a fixed *dog wall*. This is attached to the base poles (*tiang pemun*) and extends through the centre of the house along its entire length. Thereby it bisects the building into two equal halves and separates its two interior parts – the family rooms and the gallery (Freeman 1955b: 1, Sather 2006: 70–71, 83). The most important parts of the residential section are the *biliks* – the family rooms, which serve both for living and for storing possessions (Freeman 1955b: 1, Jensen 1974: 29). Their width is quite variable, depending on the status and the wealth of the family that inhabits the *bilik*, most typically in the range of 3.5–7 m, with an average of 5.5 m. Their depth within the one longhouse is then relatively constant at around 5–6 m. Each apartment, and therefore also the *bilik*, usually has three rows of columns – one central and two lateral rows, which also form the wall separating the adjoining rooms (Sather 2006: 72, 75–77). Each room has one main entrance to the gallery through lockable doors made of wooden boards hung on hinges. Sometimes different characters are carved or painted on the door – lizards, grotesque supernatural beings or indecent human caricatures (Freeman 1955b: 1, Low 1848: 172, Roth 1893: 27).

The side-walls of *biliks* are often low (Sather 2006: 83) and between relatives and family friends are connected by smaller doors or by openings that enable internal communication (Freeman 1955b: 1). The rooms usually do not have any windows, however, the roof is sometimes constructed in such a manner that it can be lifted about 50 cm with a rod (Roth 1893: 27–28). In this manner, smoke can be released and fresh air let in. A traditional hearth (*dapur*), today replaced by a stove, used to be placed on the floor inside the room (*bilik*), immediately behind the front wall (Low 1848: 171, Roth 1893: 28, Sather 2006: 74). During the pre-colonial period the rooms were equipped with hardly any furniture. The floor served as a table and the Ibans squatted while they ate (Roth 1893: 28). On the floor there were always layers of mats with baskets on them in which the residents stored their clothes (Roth 1893: 28). Also used for storing the family assets were wooden chests and shelves on the walls (Freeman 1955b: 1).

In front of the *bilik* there is another roofed part of the apartment known as a *ruai* (Freeman 1955b: 2, Roth 1893: 29). That, as a family room, represents a private property of an individual household, however, unlike the latter it has no side-walls, thereby creating a continuous gallery that extends along the entire length of the longhouse. It has the same overall dimensions as the *bilik*, to which it belongs, and is divided into several zones (Sather 2006: 84). The entire gallery floor is usually covered with a number of large mats.

Above each *bilik* and the adjacent part of the gallery there is an attic (*sadau*), in which rice and agricultural tools are stored in large bark containers (Freeman 1955a: 3). This is located at a height of about 3 m above the floor of the room (Komanyi 1973: 55) and it is accessible by means of a ladder that is located either in front of or inside the *bilik*, close to the entrance (Sather 2006: 84).

In most longhouses the gallery area opens into an open-air veranda called a *tanju* (Freeman 1955b: 2–3, Sather 2006: 81, 84). All of its independently owned parts are combined to create one uninterrupted platform, usually 6–8 m wide, in front of the building. It is connected to the gallery through several doors and windows in the wooden wall (Komanyi 1973: 53). At its outer edge there is usually some sort of railing. Access to the house is via ladders made from a single piece of timber, or by regular stairs (Sutlive, Beierle 1995: 2). These are usually located at both ends of the *ruai* (Sather 2006: 83) and/or on the veranda (Roth 1893: 27).

Next to some buildings there may even be latrines. If not, the river and/or the holes in the floor on the front veranda and in back areas of rooms serve for the same purpose. In the second instance, the faeces are digested by the pigs and the poultry that are kept beneath the house. The traditional longhouses still have no formal system of waste-disposal, therefore the ground under and around them is frequently covered with an abundance of garbage of all kinds (Bedford 1959: 204).

The Bornean climate and environment play a significant role in the deterioration of building materials and therefore the Iban longhouses require regular repairs and rebuilding (Ting 2005: 7). In their

original location the Ibans only repair their houses and expand them by adding new apartments. This reconstruction is always carried out at the new location about once every 15 years. This is usually necessary due to the exhaustion of the soil in the area or as a result of the effects of disease or fire. In the second case, the old house is completely abandoned because of these harmful forces and none of the original material of the building is used for its reconstruction. A new longhouse is also built when the population of the original longhouse splits into two factions because of an internal dispute.

In terms of interpreting the form of the Neolithic longhouses located in Central Europe it is definitely requisite to pause briefly to consider the reasons for the raised floor level of the Iban houses. There is not just one single factor that is the reason for this particular design; there are both numerous and mutually complementary reasons for this manner of construction (Alexander 2006: 31–32, Komanyi 1973: 47–48). The foremost one is the protection of the inhabitants both from flooding and from the heat of the tropical climate and also from enemies and from the dangerous jungle animals. The second is that the terrain is frequently uneven and is always waterlogged and therefore erecting a house directly on the earth would not be very practical. The third is the resultant free space beneath the floor of the house that provides ideal shelter for such domestic animals as chickens, pigs and cows. It is also very efficacious in terms of waste management, since the domestic waste that ends up right here, is disposed of by feeding it to the animals.

WHY LONGHOUSE? NO OTHER CIVILIZED WAY TO LIVE!

If we try to briefly summarise why longhouses existed in these three areas (*Table 1*), then certainly the size of the community that inhabited it features in first place. The economic subsistence model of all the societies studied required, at least seasonally, the coming together of a larger number of people. Organising food supplies necessitated the implementation of an elaborate chain of activity that the nuclear family was able to manage only with difficulty (Wilk, Rathje 1982: 632). Another equally important reason for the existence of larger residential groups might be the ongoing need for the accumulation of assets in order to increase the prestige of the chief-leader and thereby the status of the entire community. In this context the ceremonial rites and the potlatches documented on the Northwest coast represent an example par excellence (Drucker 1955).

Other parameters of longhouses in the excursus submitted refer to a specific cultural background (*Table 2*). Interesting in this context is that: a) the ground plan of the longhouse may not be stable, but can be changed (expanded) during its occupation in relation to the actual needs of its inhabitants; b) in the two examples mentioned above longhouses are occupied rather on a seasonal basis, while all the societies represented allow for regular settlement relocation; c) the longhouse is never just a place to sleep, but serves for a wide range of varied activities. Critical amongst these is the storage of food supplies.

An interpretative summary cannot be complete without a comparison of the original concept of the Danubian and the general continental European Neolithic longhouse settlement with the new insights. From the formal and functional perspective of the original model, the Neolithic settlement took after the traditional village as we know it or as we imagine it today. Only a few structures, all inhabited, were standing in one horizon period at a time. The reconstruction or even the relocation of settlements took place on a serial basis. The houses took on the appearance of long above-

TABLE 1. Comparison of construction specifications of longhouses mentioned in the text.

Society	Roofed length	Roofed width	Construction	Floor location	Roof material
Chinook	Min 6 m Max > 120 m	4.5–9 m	Wooden frame and planks	On the ground	Planks
Iroquois	Min 10 m Max > 120 m	4.5–8 m	Wooden frame and barks	On the ground	Bark shingles
Iban	Min 30 m Max > 300 m	10–15 m	Wooden frame and planks	Raised	Shingles or thatch
Danubian Neolithic	Min 6 m Max > 45 m	6–7 m	Wooden frame and wattle and daub	?	?

TABLE 2. Comparison of cultural involved attributes of longhouses mentioned in the text.

Society	Reconstruction of the building	Number of inhabitants	Ground plan	Housing	House function
Chinook	Every 20 years	Entire household, i.e. 20–100 people	Stable	Generally seasonal, the wooden frame is stable but other materials can be removed to other house	Living, processing and storing food, manufacturing, rituals
Iroquois	Every 10–15 years	Between 5 and 20 families	Expanding	Generally seasonal with regular relocation of the settlement	Living, processing and storing food, manufacturing, rituals
Iban	Every 15 years	Commonly 60–120 (min. 12 to max. 480)	Expanding	Permanent but with regular relocation of house	Living, processing and storing food, manufacturing, rituals
Danubian Neolithic	?	?	?	?	?

ground structures with a floor at ground level. The number of poles inside a building is explained both in accordance with technological reasons and also symbolically: people brought the woods into the house, and took themselves into the woods (Whittle 2009: 257) (*Figure 9*). The objects deposited around the house have a direct relation to the activities that took place there.

The results of the archaeological analyses of the past decade present the opportunity for the formulation of a new model of the Neolithic settlement. No direct proof exists of the original traditionally defined appearance of Danubian longhouses (*Figures 9–10*). The lack of general evidence at floor level may indicate that the original basic level of the living area was above the ground (*Figure 11*). Within a single chronological horizon, a Neolithic settlement was constituted from a conglomeration of inhabited and abandoned houses. The space of the latter may have served as a sacred

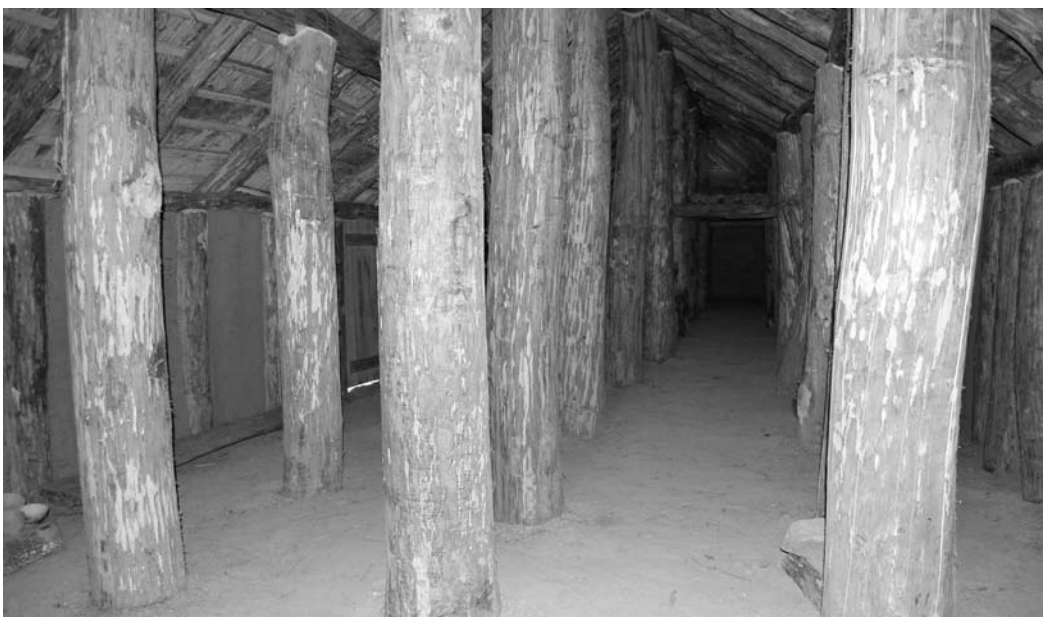

FIGURE 9. Inside the reconstructed LBK longhouse. Take a notice of short distances between the poles. Photo by P. Květina at Všestary Archeopark.

dwelling for dead ancestors as well as, in an entirely secular manner, a place for depositing settlement waste or for keeping farm animals. A direct relationship between the localisation of objects and their place of use in the context of a living culture does not therefore exist. There is still minimal information concerning the number of inhabitants and the social structure of the longhouse residents (Milo *et al.* 2004).

From the above summary of the general knowledge concerning Neolithic longhouses and about the society that inhabited them a certain degree of archaeological helplessness can be clearly felt. This perhaps stems from the conflict between the methodological systems of knowledge that are currently offered by the natural sciences and the actual archaeological basis. Since a certain point in time the latter has not changed qualitatively, only quantitatively, which does not take the final interpretation of sources and also therefore our imagination of the world of Neolithic farmers anywhere. A typical example in regard to this stagnation stage is the reconstruction of Neolithic longhouses. Based on this example, we have tried to suggest that maybe there is no reason to refuse looking for testable models amongst ethnographic examples.

And these do not even have to be the actual houses. J. Birch has created an interpretative model of the social integration of the Iroquois populations during the 15th century AD, based on archaeological documentation of the aggregation of houses and settlements (Birch 2012). This schema is extremely easily transferable and testable, especially in the Central European Neolithic environment. The change in the Iroquois settlement patterns was caused by the operation of a mechanism known as coalescence. Due to this mechanism, in the mid-fifteenth century the small village "longhouse communities" joined together in larger aggregates (Birch 2012: 653). One of the key items of archaeological evidence concerning the transformation of Iroquois villages is a change in the strategy for dealing with waste. In the original settlements waste from domestic activities was collected in middens located at the ends of the houses in such a manner that more than one house contributed to each midden (Birch 2012: 664). In contrast, the refuse disposal patterns of the newly organised large villages (e.g. the Mantle site) were highly structured. For much of the duration of the occupation

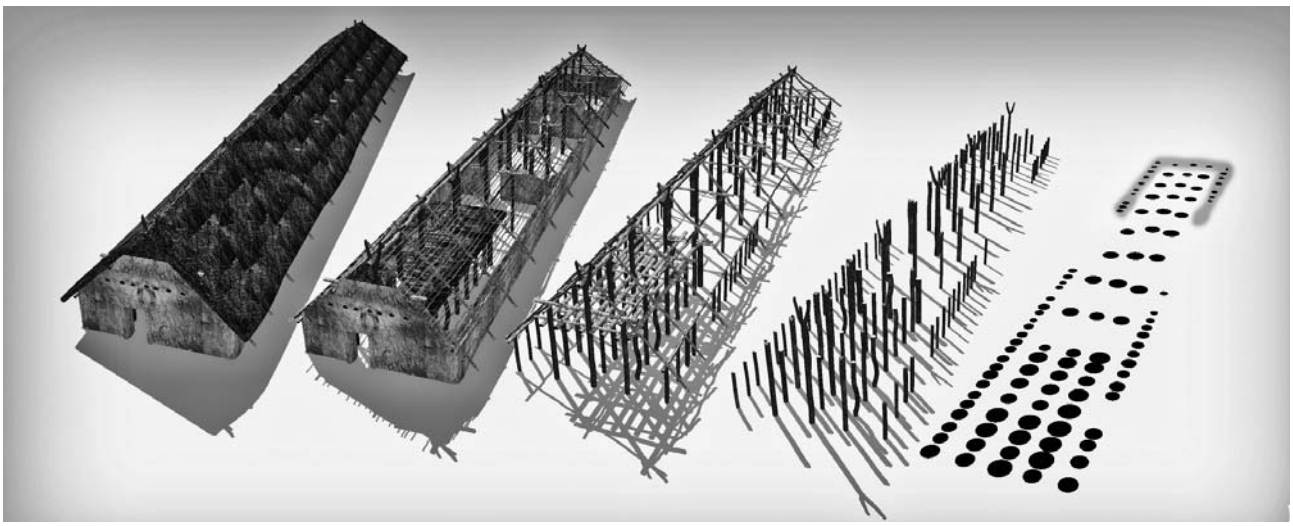

FIGURE 10. Traditional technological reconstruction of the LBK longhouse. Illustration by P. Vavrečka.

FIGURE 11. Hypothetical reconstruction of the LBK longhouse with living floor above the ground. Illustration by P. Vavrečka.

of the sites, waste was channelled into a single hillside midden located outside the village (Birch 2012: 664). This element of change that is clearly visible in archaeological sources, together with other symptoms, is interpreted as evidence of growth in the internal organisation of indigenous communities, which certainly did not come about without some changes in the social hierarchy and the social integration. In practical terms this means the transition from intra-longhouse groups to larger, supra-household, kinship-based residential groups.

A similar pattern of settlement and social change can be observed even between the horizons of the older Neolithic period represented by the LBK Culture and those of the mid-to-late Neolithic period of the SBK Culture (*Stichbandkeramik*, Stroked pottery Culture; 5000–4500 cal BC). The pattern of refuse management during the LBK stems from the physical layout of the loam pits that flank the long walls of the house (*Figure 12*). These pits are thought to have been created during its construction as a source of clay for the wattle and daub walls (Modderman 1988: 92). These pits contain archaeological assemblages,

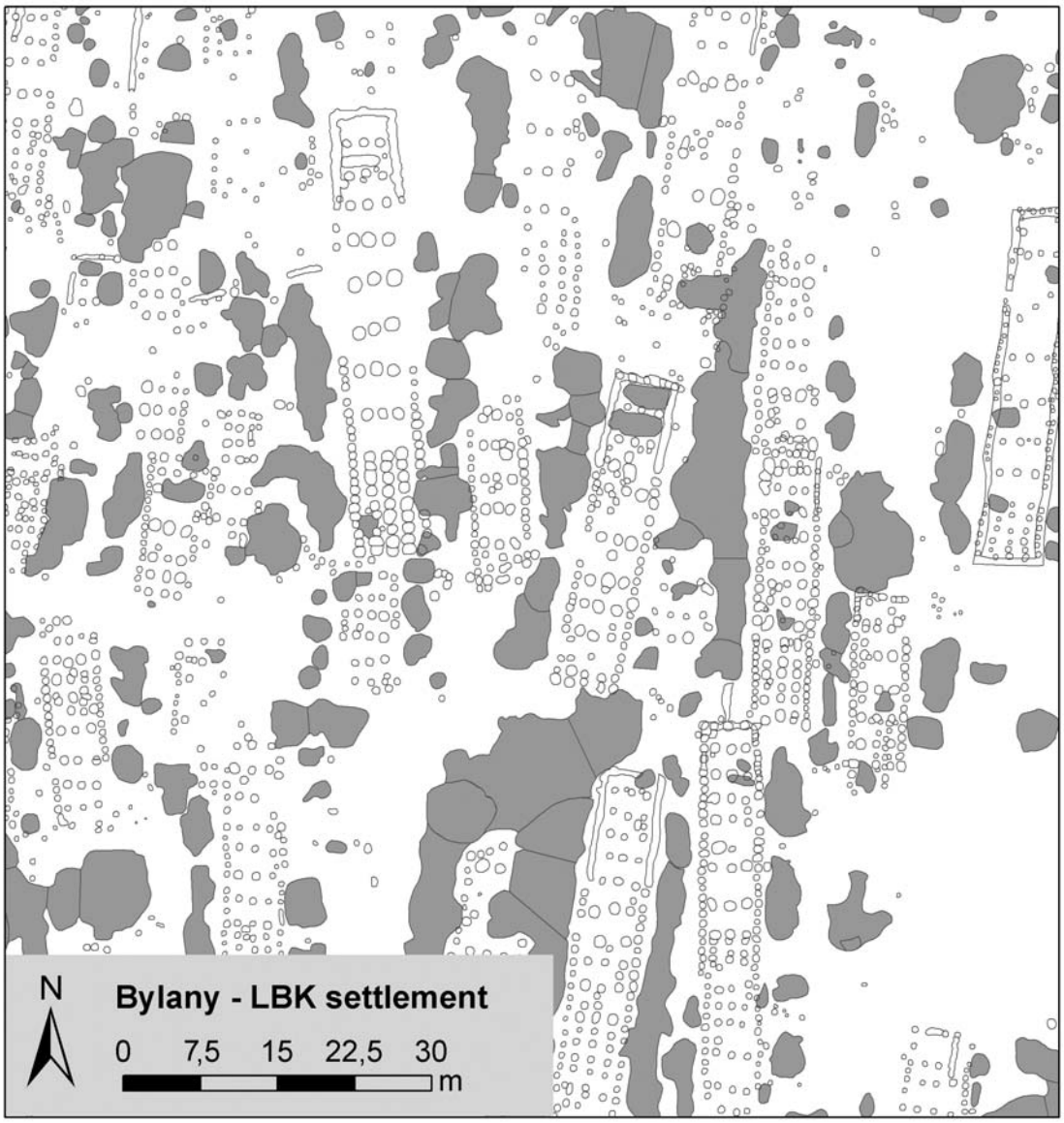

FIGURE 12. Archaeological pattern of the LBK settlement. Bylany, Czech Republic.

which undoubtedly represent the waste from activities taking place in the living settlement. Although long remaining in force (e.g. Coudart 1998: 73), today it is not possible to accept without question the hypothesis of a direct relationship between the waste in pits and the activities taking place in a specific house (Květina 2010a, Stäuble 1997). In spite of the existence of pits in the settlement, which have remained open for some considerable time, this suggests that the village as a whole was not founded in an organised manner. The creation, demolition and the spatial layout of individual houses corresponds rather to the needs of specific household groups than to those of the entire settlement community. In the subsequent SBK period the situation was changing: the pits disappeared from the longer sides of the longhouses and moved behind or in front of the house (*Figure 13*). The waste was then deposited outside the exposed area of activity. Since the construction technology of the building does not differ from that of the LBK, it is difficult to explain the change in the spatial patterns in any way other than as social factors.

The interpretation of this situation would correspond to the LBK settlements de facto being composed of independent longhouse homesteads. The level of cooperation between them did not reach the stage of institutional organisation. Although clustering and consolidation took place there and, in some cases, the settlements were enclosed, these activities did not have an organised form. The SBK settlements, on the contrary, formed internally cooperative units and the longhouses lost their original economic and social independence. The construction of the settlement was an organised act and the area was managed on a community level. As complexity developed the hierarchy within the community and between the individual communities was growing, evidence of which can also be found in the Neolithic rondels (*Kreisgrabenanlage*, rondel; Řídký 2011).

The purpose of this text has definitely not been to radically alter the interpretation of the Neolithic longhouses. Rather, we have sought to highlight the forgotten potential of ethnographic parallels. These can be seen as a source of archaeologically testable models (e.g. with regard to the level of the floor, the diversification of the interior, the durability of the buildings or the number of inhabitants). They can also serve for the imagining of the living world of archaic societies without the ambition of creating direct parallels with the Neolithic era. And in this regard it is also possible to understand the answer provided by the Borneo natives when they were asked why they build and inhabit longhouses: "There is no other civilized way to live." (Metcalf 2010: 2).

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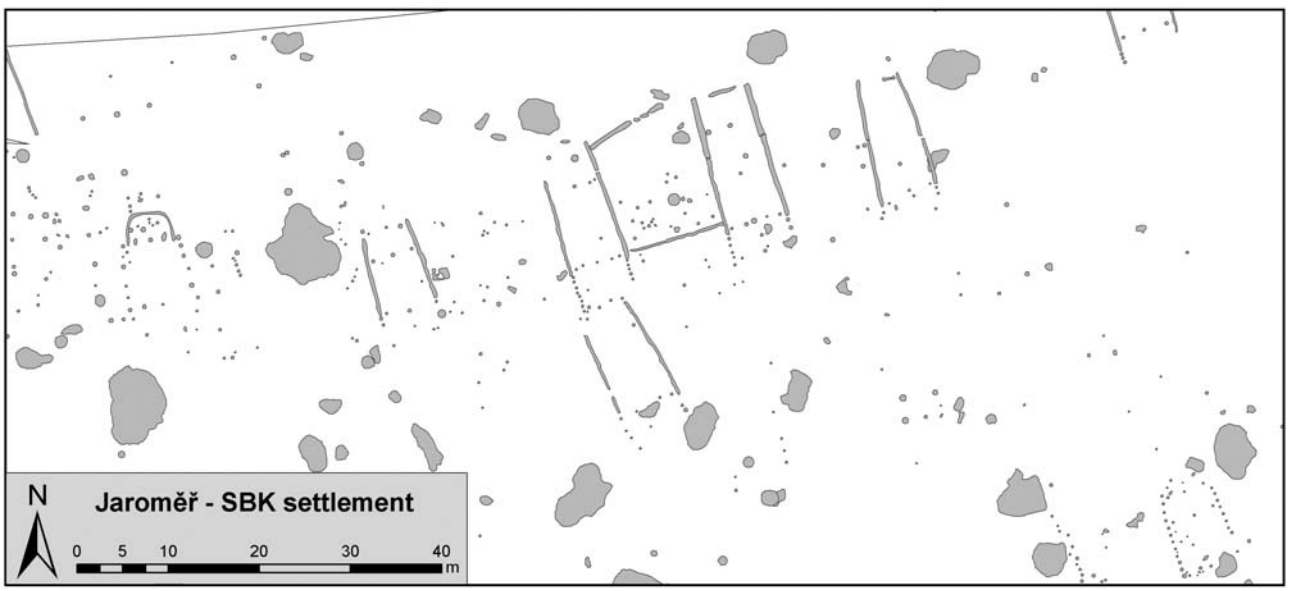

FIGURE 13. Archaeological pattern of the SBK settlement. Jaroměř, Czech Republic. Modified after Burgert (2012).

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