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Some Remarks on Social and Symbolic Significance of the Early Neolithic Longhouses Based on the Applications and Spatial Distribution of Ground Stone Type Tools. The Case of the Linear Pottery Sites from Lesser Poland

Abstract

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This article attempts to present some aspects of the spatial reconstruction, modes of use, and social relations in the longhouse settlements of the Linear Pottery culture (LBK) by means of a contextual distributional analysis of ground stone artefacts. Three LBK settlement complexes from Lesser Poland (southern Poland) were selected for analysis based on a considerable number of finds of ground stone tools yielded by the excavations. Accurate determination of the intended use of a stone object, as indicated by the traces of use on its surface, was of central importance. Based on the above data, the author has distinguished two types of household sectors in LBK settlements with longhouses, namely domestic and communal. It is argued that the inhabitants of a given longhouse used the domestic sector for their purposes, while the latter served the community. Significant differences in the proportions of ground stones were found between settlements and between the settlement phases of a village. This leads the author to consider whether there might have been specialized settlements for a particular microregion in addition to the function served by a single longhouse. Each settlement would have specialized in different household tasks.

Keywords: Neolithic, Lesser Poland, longhouses, stone tools, Linear Pottery culture (LBK)

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Introduction

Stone artefacts form a group of archaeological evidence that has already proven many possible interpretations. In addition to raw material, provenance, indications and modes of use, the context of the finds is an object of analysis that has already received much attention and has been meticulously studied. In recent years, an extensive literature has addressed the contextual approach to the finds analysed. It focuses primarily on ground stone objects and attempts to examine how they were used in the past and how they were disposed of and deposited. The contextual approach has been used to hypothesize about the social organization and relationships between members of a particular community (Adams 1989; 2002; Edmonds 1995; Baysal and Wright 2005; Tsoraki 2007; 2011; 2016; 2018; Hamon 2008; 2020; Graefe *et al.* 2009; Wright 2013; 2014; Rosenberg and Garfinkel 2014; Pavlů 2016; Li *et al.* 2020).

Previous studies have shown that the analysis of ground stone artefacts can shed light on many important aspects of human life in Neolithic houses, particularly how households may have functioned. They prove useful in distinguishing house zones within a settlement and in assessing functions and external relationships between houses and groups of houses between settlements (Tsoraki 2007; 2011). Studies of the spatial distribution of ground stones within a house provide information about the relationships within the house. Depending on the find context, ground stones may also indicate the spaces that may have been used as production or disposal sites (Zimmermann 1995; Wright 2008; Tsoraki 2016; 2017). The number of zones and their location in relation to houses reveal how the interior of the settlement may have been organized (Hachem 2000; 2011; Lenneis 2004; Cutting 2005; Stäuble 2005; Bánffy 2013; Hoffmann 2013; Czerniak 2016; 2018; 2019). Analysis of use marks on ground stones can also provide evidence of how tools were disposed of or recycled (Szydłowski 2017, 84–90; Bocquentin *et al.* 2020; Li *et al.* 2020). This evidence has been shown to be particularly important when examining, for example, the realm of religious belief, such as ritual offerings prior to house construction or deposition at a specific, prepared site (Tsoraki 2018). The importance of ground stones for the study of the functioning of households of different types in prehistory is therefore undeniable.

The significance and function of LBK longhouses has been widely discussed, and approaches to the subject have evolved considerably in recent decades (Lenneis 1997; 2008; 2012; Borić 2008; Bickle and Whittle 2013; Czerniak 2013; 2016; 2018; 2019; Hodder 2013; Hofmann 2013; Hofmann and Smyth 2013; Pyzel 2013; Coudart 2015; Bickle *et al.* 2016). Differences in the size and layout of the longhouses and the presence or absence of an upper storey have recently been surmised from reconstructions and visualizations of architectural objects. The corridors in these houses and their significance in social contexts are currently being studied (see Czerniak 2019, further reading ibid.). However, the study of Neolithic longhouses suffers from a considerable lack of interest in the reconstruction of social relations, as well as the functioning of these structures based on the distribution of ground stone tools.

Can the analysis of the distribution of the ground stones also contribute to the discussion of the meaning and the way the LBK longhouses were used and functioned? It is not only insights into the relationships within longhouses, the distinction of zones, and the function of longhouses within a settlement that should be studied. Rather, it is the external relationships between longhouses and longhouse groups between settlements that are important.

Aims

Therefore, the analyses conducted in this article focused on exploring the context of ground stone artefacts in LBK settlements with longhouses to obtain information about the functioning of their inhabitants' households. Ground stone artefacts were selected because they were considered by the author to be the most appropriate for determining the range of use and function of zones in the longhouse and its immediate surroundings. Based on information about the find context of ground stone objects, the author attempted to test whether the different use of tools could be used to infer the use of spaces such as longhouses, zones within them and the settlement, activity spaces, or places of disposal, as well as a broader organization of space and interrelationships between stone artefacts and the structure of the longhouse. The final objective was to examine the relationships between groups of artefacts found in a particular settlement and those from neighbouring sites, in order to assess how much they differed in their meaning and the uses attributed to them. From this, the author derived hypotheses about the function of longhouses within a settlement and in regional settlement complexes. In addition, by examining ground stone material, he attempted to substantiate opinions about the role of this source in religious beliefs, such as the deposit of ritual offerings prior to house construction or deposition in a special, prepared location.

Methodology

To put all this in perspective, however, it is necessary to consider the context of the stone artefacts within the settlement and their relationship to other sites nearby. To this end, it was necessary to typify a settlement complex that had the characteristics that would allow us to examine these questions. The selected sites had to meet several conditions. They should be covered by excavations in open areas. Each site should have at least one longhouse. The sites with longhouse(s) should be from one region so that they can be compared, especially with respect to soil types, relief, and climatic conditions. They should also be multiphase sites in order to examine changes over

time and to show differences between sites in the same chronological phases. All stone finds recovered during excavation should be catalogued, and a large proportion of them should be from homogeneous objects with a known chronology. At least one of the sites should have an associated contemporary cemetery to compare settlement and burial contexts. Thus, it should be a settlement complex that, if possible, does not cover a large area, has complete inventories of all types of stone artefacts and documented find contexts, and the settlements that comprise it have a similar chronology in order to determine the relationships mentioned above. As for the ground stone artefacts, the stipulation was that all should be objects from excavated and homogenous layers or features with a known chronology.

A complex of this type, exhibiting all these characteristics and selected for study in this article, is an Early Neolithic assemblage of sites attributed to the Linear Pottery culture in Lesser Poland, Brzezie and Targowisko (Wieliczka County) and Modlnica (Kraków County) (Fig. 1).

The excavations yielded several thousand stone finds with clearly defined contexts. All stone objects were subjected to macroscopic analysis to separate out polished stone artefacts and intact tools, which were then used and subjected to use-wear analysis to determine possible uses according to detailed description (Wright 1992; Korobkowa 1999; Szydłowski 2017). To identify type and function, the surface of stone objects was examined under a microscope at up to 45x magnification, with light directed at the dry and wet surface at various angles. The observed use marks were compared with the database of surface use marks compiled by the author for Neolithic ground stone tools (see Szydłowski 2017). Particular attention was paid to grinding plates and querns, as they had similar macromorphology, but each had a completely different range of uses. Accurate distinction of uses was considered essential for drawing further conclusions about this tool category. The functional distinction between hammerstones, handstones, and the pounder/grinders was also important (Szydłowski 2017, 69–80).

On this basis, a collection of tools was selected that are believed to have been used for important household tasks, such as flour extraction (querns, grinders, pounders, pounders/grinders), grinding (grinding plates), and woodworking (adzes).

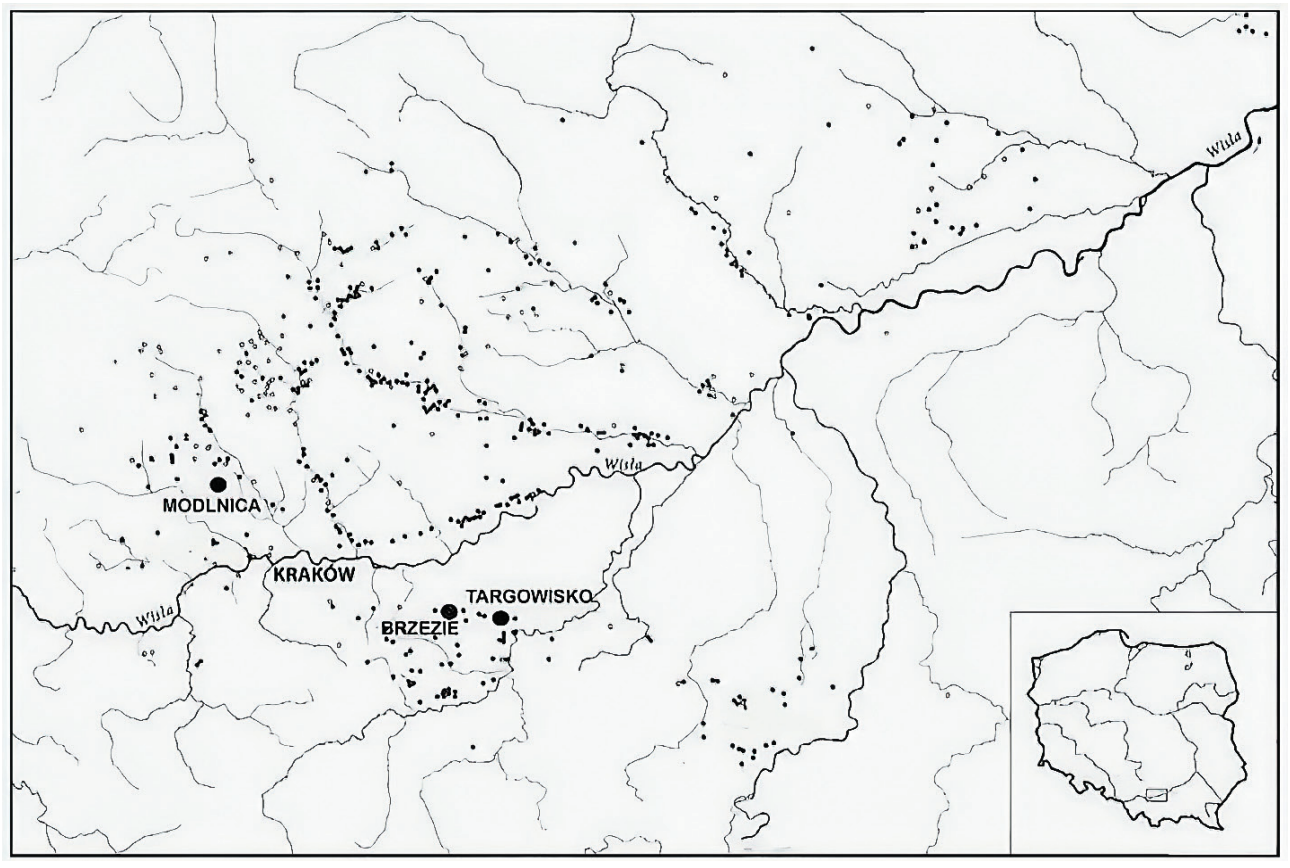

Fig. 1. Distribution of LBK sites in the upper Vistula basin. Larger black dots mark the location of LBK sites mentioned in the text (after Czekaj-Zastawny 2008, fig. 53; Czerniak 2016, fig. 2. 1; with modifications by M. Szydłowski).

The grinding plate. Unlike the polishing stone discussed below, this tool is flat and has a fairly extensive use surface with similar, but somewhat fainter, elongated use marks covering more of the face than the edge (Fig. 2). Grinding plates are usually about 3 cm thick and have one large active area or optionally two. The wear marks are visible over the entire surface, although they are much more pronounced on the edges. Grinding plates with more sophisticated craftsmanship have also been documented. They have a small opening, heavily rubbed sides about 1 cm thick, and a curved cross-section.

The polishing stone. This object is relatively large, not flattened, in most cases with one active surface (the smaller ones may have two) compared to the grinding plate. Based on the shape of the surface, two variants of this tool were distinguished: flat and semicircular. Long wear marks, which are easily visible during megascopic examination, characterize the tool. They are deeper and wider than those of whetstones. Unlike whetstones, such tools were used for polishing larger and heavier objects.

The polishing pebble. This is a small, spherical, ovoid, multipolar tool with well-polished and scratch-free active surfaces that are flattened to varying degrees. The surfaces bear shine marks from use and abrasions indicating that they have been used extensively.

The pad. This is a flat object, so large that a pot or other object can be placed on it for processing. The upper horizontal surface is active, while the lower is shaped to ensure the stability of the tool. In the plane, it is a circular tool created by hammering the edges. Tools like this were made from rock fragments that naturally have a flat surface, occasionally smoothed by grinding. Signs of use in the form of sheens and abrasions can be seen, especially in the centre, indicating long-term use for various purposes. However, no longitudinal scratches or circular abrasions can be observed, which distinguishes them from grinding or rubbing tools.

The handstone. This artefact (other names: grinder, muller, meule active, and percutant) has one or more grinding surfaces. It is approximately flat, plane-convex, or loaf-shaped and bears only circular grinding marks and abrasions on the active surfaces.

The hammerstone. A hammerstone or pounder is described as an elongated, egg-shaped, or cylindrical object. Its exterior surfaces bear patch-like abrasions that attest to the presence of at least one usable surface. Two subtypes of shapes are distinguished: oblong, with lenticular and cuboid variants, and round. This type is typologically and practically similar to a pounder/grinder.

The pounder/grinder. This is the most common type attested in archaeological contexts (Fig. 3). It is typically a multi-sided, elongated, or round artefact that has at least two active surfaces (one flat and one polar). The plane surface shows signs of use due to grinding and polishing activities. On both sides there are signs of use: horizontal – wider, and verti-

Fig. 2. Sandstone grinding plate from Brzezie 40 (photo by M. Szydłowski).

Fig. 3. Granite pounder/grinder from Targowisko 16 (photo by M. Szydłowski).

Fig. 4. Sandstone quern from Targowisko 16 (photo by M. Szydłowski).

cal – pointed. This feature distinguishes the tools in question from hammerstones and grinders, which usually have only one active face. Several subtypes of pounders/grinders have been distinguished based on variations in shape. However, since shape can indicate different modes of use that are not apparent from initial examination, it is necessary to perform a macro-analysis of use wear at the same time.

The quern. This artefact belongs to the large-sized objects (Fig. 4, 5). There are grinding marks on the active side. There are two main types of querns: trough querns – with raised sides, showing different depth of cavities, and saddle-shaped querns – with straight sides and flat active face, slightly lowered from use. The lower parts are reduced to form similar shapes. Querns are also divided according to the size of the active surface into large "stationary" querns and small "pocket" querns.

The adze head. It is a typologically differentiated blade tool (Fig. 6). Two main types and several subtypes are known. All adze heads have one (lower) flat side from which the blade rises upward at an angle, while the other (upper or dorsal) side is convex and shaped in different ways. Considering these proportions, two types have been distinguished: high adze heads with short tip and long cross-section (approximately square in vertical arrangement and with slightly rounded sides) and low adze heads with wide blade and short cross-section (square, horizontal and less than 1 cm high). Depending on the cross-section, three variants can be distinguished: circular, loaf-shaped, and pointed. Among the

Fig. 5. Sandstone quern from Modlnica 5 (photo by M. Szydłowski).

Fig. 6. Amphibolite adzes from Targowisko 16 (photo by M. Szydłowski).

low adze heads, two variants were recognized: a high trapezoidal one with a flattened head part and a three-sided one with a small round head part. The entire group of adze heads embodies large and small objects; intermediate forms are rarely encountered. Each specific type compares to another in its typological group in terms of size. For large objects within a given variant, the greatest difference in size is no more than 1 cm. In contrast, a stronger size match was observed for smaller objects. Other types of this group of devices are found rather rarely, and these are usually damaged primary forms that have been modified.

Non-tools

The paving stone. It is a solid element of ten to several dozen centimetres in size, with a flat or slightly convex upper surface and a semi-circular lower surface. There are wear marks in the centre of the flat surface, and there are many shiny spots on the rounded edges. The wear marks on the top surface, visible to the naked eye, are the result of many years of use, which was so heavy that even a patina has developed. Stone pavers were laid to pave paths, house floors, backyards or squares in settlements and cemeteries. Since they are everyday objects, they are exceptionally rarely documented, not to say neglected in studies of Neolithic stone management. All paving stones were divided into two classes according to their shape and size: Paving slabs (large, roughly square with two flat surfaces) and so-called "cobblestones" (cuboid, the upper surface is approximately convex, the lower surface rounded).

The stone flake/splinter. This is an elongated piece of rock that is relatively thin in relation to its length. Flakes are the only type associated with the processing of rock raw materials, so they may testify to the pre-treatment of the rock when found at a site. The number of flakes documented in settlements is small, suggesting that stone working was in all likelihood a spontaneous activity, with no evidence of a specialized stone working workshop. The following types of flakes are distinguished: cortical flakes-the entire outer surface is natural; subcortical flakes-only one surface is natural, indicating that it was removed from the secondary core; and core flakes have one to a few negatives indicating earlier removal. Stone splinters usually have a distinct impact mark, indicating that the strike was often made several times, and depending on the rock type, it may have a prominent bulb. Some flakes may also have negative scars marking the previously detached flakes. Their sides show attempted retouching in the form of small negatives of chipped pieces. Small dents are occasionally visible on one edge when viewed microscopically, suggesting that the flake in question may have been used as a scraper of some sort. Scrapers (flakes) vary in size, from tiny (about 1 cm) to large (even 0.5 m). The shape, size, characteristics, and degree of accentuation of the bulbs are determined primarily by the type of rock from which they were detached.

The core. This is a piece of rock that has a few distinct ridges of detached flakes (Fig. 7). From the shape and thickness of the internegative ridges, the presence of a bulb and the length of the waste pieces, combined with a parallel analysis of the technological parameters of the rock that makes up the core, it is possible to determine the technique used to work the stone.

The drill pin. This manufacturing waste is a "negative" produced when drilling holes, for example, shaft holes of axes (Fig. 8). The object is slightly tapered, alternatively straight or hourglass shaped and is found mainly in fragments due to the method used.

Fig. 7. Sandstone core or flake from Targowisko 16 (photo by M. Szydłowski).

Fig. 8. Amphibolite drill pin from Modlnica 5 (photo by M. Szydłowski).

Analysis and discussion

The Early Neolithic site complex analysed in this article includes three groups of sites: Brzezie (sites 40 and 17), Targowisko (sites 16, 12/13, 14/15, and 10/11), and Modlnica 5 (Fig. 1). These sites are part of an extensive and unique settlement group that represents the remains of the earliest agricultural communities that inhabited this area. With the exception of Modlnica, which is located on the other side of the Vistula River, the sites discussed are close to each other. The settlement complex in question here was the subject of extensive rescue excavations a few years ago in the run-up to the construction of the A4 motorway. Despite the considerable scale of the excavations, insufficient attention has been paid to studying the contextual significance of the deposition of ground stone artefacts and their relationship to the longhouses in these settlements. These are the sites with three or four settlement phases, distinguished mainly by ceramic features (Czerniak *et al.* 2011; 2012a; Czerniak 2018; Kadrow *et al.* 2021). They were found to cover a limited period between the late phase of the Music Note subphase and the earliest or middle phase of the Želiezovce subphase of the Linear Pottery culture, ca. 5200–4900 (Czekaj-Zastawny 2014, 94; Kadrow *et al.* 2021, tab. 1).

Settlement complex in Brzezie

This settlement complex with longhouses includes two adjacent sites, Brzezie 40 and 17.

Brzezie 40

At least three settlement phases were identified in the settlement development of Brzezie 40 (Fig. 9), which roughly corresponded to the early and classical stage (IIb) of the Želiezovce phase (Czerniak *et al.* 2012b, 276–277). However, the exact duration and development dynamics can hardly be specified. The houses varied in size, layout, and construction techniques (Czerniak 2019, 234). House 6 is particularly noteworthy with its unusual parameters and length-to-width ratio (Czerniak 2019, fig. 2).

A total of 1100 stone objects were uncovered. The category of ground stones is represented only by four querns, four pounders/grinders and a considerable number of grinding plates, namely 32, of which two are complete and one is very small (Fig. 2). All the mentioned tools were made of sandstone, except for one pounder/grinder made of granite and one grinding plate made of amphibolite. Ground stone artefacts

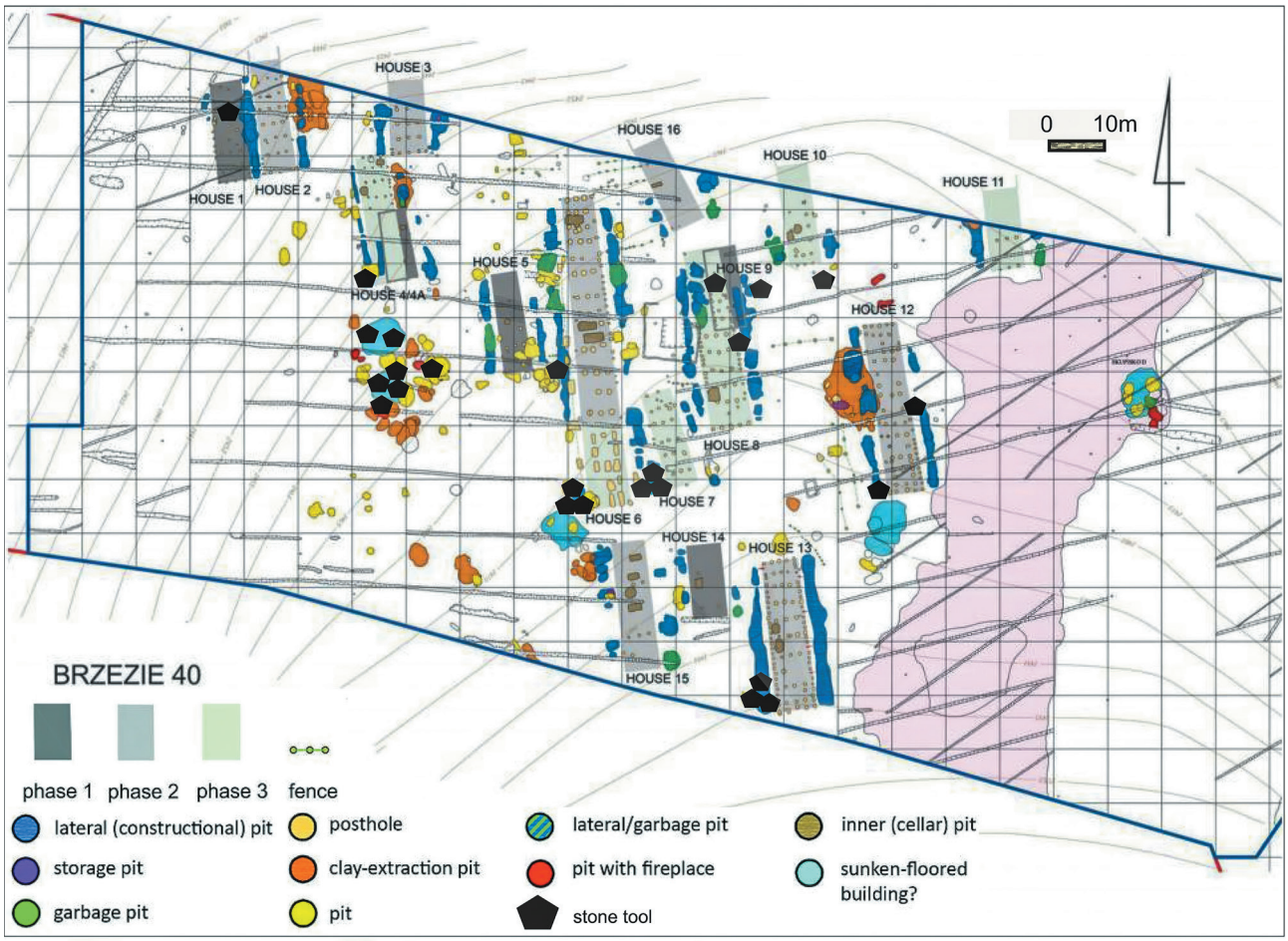

Fig. 9. Plan of the Brzezie 40 settlement (fragment), indicating the location of the longhouse (after Czerniak 2018, fig. 4; with modifications by M. Szydłowski – only stone tools from LBK objects are included in the map).

represent about 4 percent of the total stone assemblage. This seemingly small percentage is relatively high for the microregion in question, as the following statistics show. For comparison, 19 adzes should also be mentioned, all but one of which are preserved in fragments (Szydłowski 2017, 222–226).

Almost all the analysed ground stone artefacts (their fragments) were randomly distributed over different sectors of the site. However, this is not to say that no specific regularities were observed between stone objects and longhouses. Some tools show signs of what was probably intentional deposition.

Of the four querns, two were documented in longhouses 1/1a and 8/9, assigned to phase I. They were definitely found on the northern rear side in the third section from the entrance. Another was discovered near house 4a (phase I) in its front section to the left of the entrance. The last object of this type was discovered not far from the front of house 10 in an internal pit (phase III). According to the excavators, the internal pit was a feature "other than a posthole" found inside the house (Czerniak *et al.* 2012b, 230). In this case, it was a rectangular pit containing pottery, flint, and clay fragments. However, it is difficult to determine whether this feature was a small "cellar" or a structure associated with foundations that were intentionally placed there prior to the construction of the house. Its function as a waste pit was probably secondary and was converted to this when the settlement was abandoned.

Two pounders/grinders, tools related in function to querns, were discovered outside the features in houses 8 (phase III) and 12 (phase II) in the area between zones 2 and 3. The other two were excavated in a construction pit (feature 1, phase III) on the southwest side of house 7 to the left of a suspected entrance. Feature 1 is particularly notable for its content of other stone artefacts, which, in addition to pounders/grinders, consisted of four grinding plates, two polishing stones, 37 pieces of stone, and four pebbles. The substantial number of tools found in feature 1 and its vicinity suggests that this area must have served as an

activity (manufacturing) zone. Another assemblage, consisting of fragments of ten grinding plates, was found in several features of cluster A, several dozen meters from houses 4 and 5.

The analysis of the distribution of the adzes showed that these tools were even more widely scattered over the site than the ground stone tools. Almost half of them (nine adzes) were found on the surface of the site, while the remaining ten adzes each came from a different site. However, some patterns can be discerned here as well, in terms of the distribution of the adzes and the arrangement of the longhouses. In the rear area of house 9 (phase I), fragments of three adzes were found on the east side – one in the fill of an excavation pit and two on the ground surface. A fragment of an adze was also found from the east side of house 16 (phase II). One tool each was found in two pits with economic function (phase II) and one construction pit (phase I), located directly on the southwestern edge of house 6. This cluster of pits with economic use is an interesting premise for the role of this area in the hierarchy of activity areas in villages with longhouses. It is another case where stone objects were distributed in the same configuration in relation to the longhouse and clustered in the southwestern part of the house.

The distributional analysis conducted in Brzezie 40 to examine the relationship between stone tools and longhouses revealed some basic patterns that allow for a more comprehensive consideration.

It is possible to distinguish two hypothetical spheres of activity: "domestic" and "communal". The domestic sphere could have included a household area organized by a family that occupied a particular house. The family members may have concentrated their various activities in the back of the house, usually in the southwestern and, to a lesser extent, in the northeastern area. Another activity area, referred to as "communal", is located between a dozen or more and several dozen meters from the longhouses. It was intended to serve the needs of the entire settlement community. Therefore, it can be called a "common" or "communal" area. Thus, both areas indicate that the village community carried out its activities at two levels of social organization – the lower one, which was connected with the domestic, family sphere (only the members of the house participated in it) and the higher one, the "communal" sphere, which involved the members of the entire settlement community.

It was observed that stone tools were found mainly in the activity zones but were hardly registered in the houses. Based on this observation, we can assume that household activities took place outside the houses. A house was probably not used as a workshop or working space and as a dwelling at the same time. The only fragments of two querns found in the back part of the house indicate that a symbolic action might have taken place there.

The overwhelming majority of the documented tools were preserved in fragments, badly worn and broken. Only two pounders/grinders and a small adze, the result of repeated reworking of a larger adze, were found intact. Thus, the condition in which the tools were found strongly suggests that they were not intentionally and symbolically deposited, but rather disposed of as damaged, unusable items exactly where they were last used. The situation is probably different for the two querns already mentioned, which were left in longhouses. As already mentioned, practically no stone tools other than querns were recovered in the longhouses of the settlement we are concerned with here. Therefore, it is reasonable to assume that these objects were intentionally deposited and had a symbolic meaning (for analogy to the case discussed, see Nakamura 2010; Nakamura and Pels 2014). Unfortunately, due to the unclear chronology of the sites where the querns were found, it is not possible to say exactly when they were placed. The difficulty is that the remains of the huts from the first and third phases overlapped exactly where these objects were found. So, the most likely scenario is that the ritual of depositing the querns was performed when the first houses were built. Fragments of querns would have been buried where a longhouse was built. They could have been deposited as offerings before house construction began (Beneš *et al.* 2019, 134–137). Querns would be a symbolic representation of agriculture, a successful harvest, and abundance expressed through flour. However, this custom was not confirmed in the discussed settlement or in the two others analysed below.

Striking differences in tools were noted between settlement phases. Fragments of querns mostly belong to phase I, phase II – none, and phase III – only one. The situation is different for pounders/grinders: phase I – none, phase II – a few, and phase III – most artefacts. This disproportionate number of tools per settlement phase suggests that people may have taken querns with them when they left the settlement.

To support the above conclusions, we would like to refer to some examples from other regions where similar patterns have been observed. In a post-LBK settlement at Hrdlovka, a hoard of 35 grinders was discovered, thought to have been deposited during

the construction of the longhouse (Beneš *et al.* 2016, 79–80; 2019). Similar practices were observed in other post-LBK sites, such as Holubice and Goseck (Beneš *et al.* 2016, 80). An association of the Hrdlovka case with feature 1, which is located right next to house 7, is obvious. However, it would be more correct to assume that it was a pit used for economic functions associated with house 7. Rituals involving the deposition of stone objects prior to the construction of a longhouse must be studied separately.

Brzezie 17

The situation of Brzezie 40 can be compared with Brzezie 17, another settlement with LBK longhouses located about a kilometer to the west (Czekaj-Zastawny 2014). Brzezie 17 is dated to the Music Note and Želiezovce phases (Czekaj-Zastawny 2008, tab. 1). Remains of 24 houses and 619 LBK stone finds were discovered. Six settlement phases were distinguished in the development of the village. Although the number of stone objects is only half as large as in Brzezie 40, significantly more tools made of the ground stone were found. Fragments of 47 querns, 20 grinders or pounders/grinders, 18 grinding plates, and several polishing stones were catalogued, as well as 35 intact or fragmented adzes. Feature 1 in this settlement is again particularly noteworthy as it contained fragments of 10 querns, four grinders, two grinding plates, and one polishing stone. It partially overlapped the remains of Longhouse 2 from phase III and surrounded house 1 from phase VI, with which it was directly connected economically (Czekaj-Zastawny 2014, 15).

The enormous disproportion between these two neighbouring sites in terms of the number of ground stone finds should not be ignored when discussing the functions of the longhouses. They cause us to reflect on another problem. Whether we should not discuss less the function of individual houses, but instead consider the importance and function of entire settlements.

The settlement complex in Targowisko

The LBK settlement complex at Targowisko consists of several extensive settlements (sites 10/11, 12/13, 14/15, and 16) dated mainly to the Želiezovce phase (IIa and IIb), ca. 5100–4900 BC (Czekaj-Zastawny 2014, 94; Kadrow *et al.* 2021, 167). Targowisko 16 was the most extensive and rich in stone finds.

Targowisko 16

About 40 longhouses were documented at this site, associated with four settlement phases (Fig. 10; Czerniak *et al.* 2012a). It yielded the most extensive assemblage of stone objects (9264 in total) of any site discussed in this article. However, only about half of these came from features with a confirmed LBK chronology, including only three querns (fragments) (Fig. 4), one grinding plate, one grinder, one pounder (Fig. 3), and three pads. One chisel, one scraper, and one probable core were recorded from other rarely occurring Early Neolithic stone tools in settlement contexts. In contrast, 17 characteristic blade tools (three of which were complete) were documented, but only seven, including one intact, were found in features with a confirmed LBK attribution. All of the querns and one grinding plate were sandstone and a pounder/grinder was granite. All adzes were of amphibole shale of the same origin (Szydłowski 2017, 247–258). No finds of stone tools from the LBK features of the phase I longhouses were documented.

The potential sandstone core mentioned above (Fig. 7) is one of the rarest finds in LBK settlements. It was discovered in a construction pit on the east wall of house 4. Although this object has vertical signs of chipping on each side, and six negatives of previously removed flakes, one must admit that there is some doubt as to whether it is a core. It is perhaps more likely that this object is a chipped flake. In any case, it is evidence of stone working in this settlement area, especially since over a hundred stone chips, chunks, and splintered pieces have been found there.

Similar to the settlements Brzezie 40 and 17 described above, the activity areas in Targowisko 16 were also located along the walls of the houses, especially in their southwestern, western and eastern parts. In contrast, household features are relatively rare in the western part of the houses.

Such a small number of tools of the ground stone type for such a large polyphasic site is perhaps surprising. Nevertheless, it was possible to prove relationships between stone artefacts and no fewer than 15 longhouses. Only one object (adze) is associated with settlement phase I (Fig. 6: C). For phase II we can show the correlation of stone artefacts with five houses, for phase III with two houses. In contrast, the most remarkable accumulation of stone artefacts can be associated with phase IV – they were documented in features near seven houses. Fragments of querns can be assigned to a specific phase, one for each phase (II, III, and IV), with the exception of phase I, for which no finds of this type were documented. The pounder/grinder occurred only in phase III.

The modest number of tools necessary for the first agricultural communities must be surprising. It stimulates a discussion of the extent to which the in-

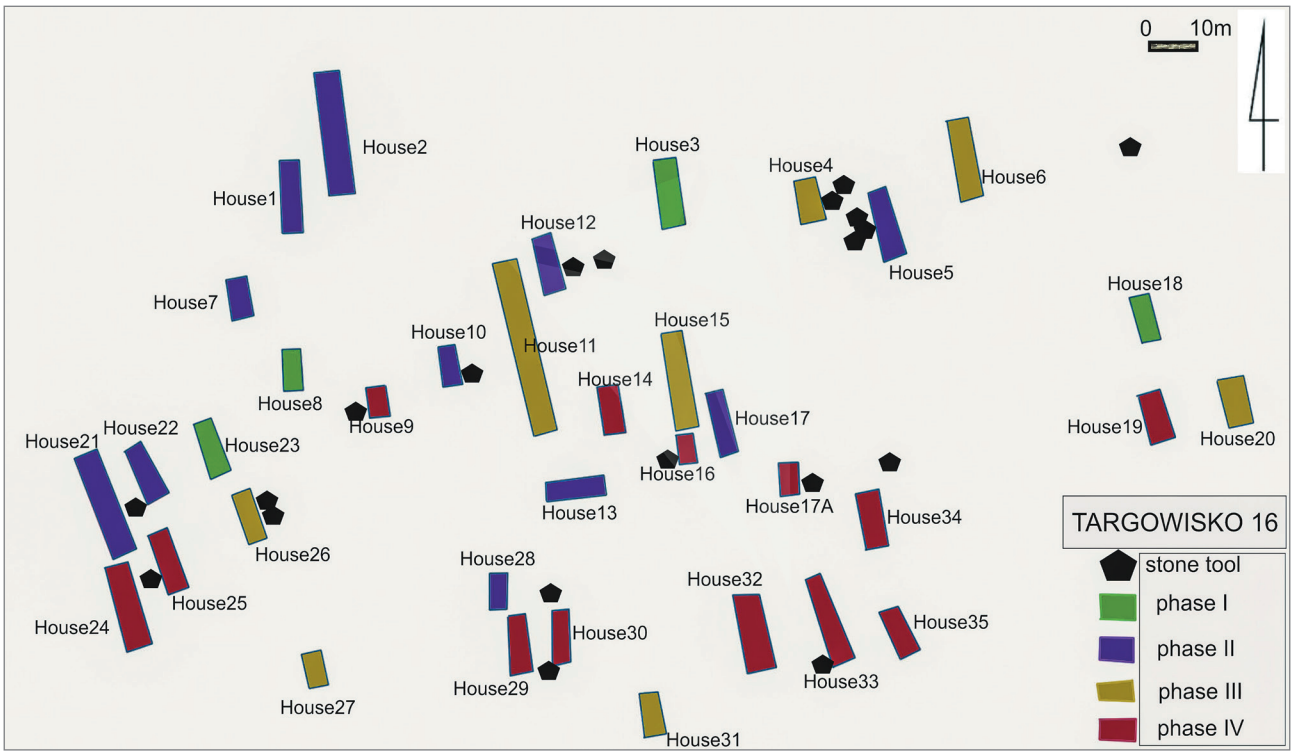

Fig. 10. Plan of the Targowisko 16 settlement (fragment), indicating the location of the longhouse (after Czerniak *et al.* 2012a; with modifications by M. Szydłowski – only stone tools from LBK objects are included in the map).

habitants considered these objects valuable to pass on to other generations and to take with them when they moved to another place. It also suggests that the essential activities of the people in the settlement may have been other than farming. Then the assumption may be quite wrong that villages with longhouses were those where the main activity of the population was agriculture. Other sites of the Targowisko complex do not show significant differences.

Targowisko 12/13

This site yielded a total of 3600 stone objects, but only fragments of two querns, one piece of a grinding plate, and six pounders/grinders represented the ground stone assemblages. They were all made of sandstone and came from different features (each from a different one), with the exception of two pounders/grinders and the grinding plate. The artefacts were widely scattered around the site, so it was not possible to relate them to each other. Although Targowisko 12/13 was a relatively extensive site with many stone artefacts, the proportion of ground stone objects was very low, only 0.025 percent, compared to the other stone classes found there (Szydłowski 2017, 239–245). The distribution pattern of pounders/grinders may indicate that they were disposed of in a disorderly manner, suggesting that they were probably less significant than the querns. As for the querns, we observed something different. They were virtually absent from this site. Several small fragments found here may indicate that this category of tools was used but not discarded.

Targowisko 14/15

Out of the total 265 stone objects documented at this LBK site, only a small fragment of a quern, a complete grinding plate, and fragments of four other plates can be considered as representatives of the ground stone type. It is very telling that not a single artefact of the pounder/grinder category was found. Apart from the mentioned fragment of a quern and a piece of a grinding plate found in a pit, all the remaining objects were chance finds collected from the surface of the site, thus they were found in a disturbed context (Szydłowski 2017, 245–247).

Targowisko 10/11

At this site, another extensive LBK settlement of the Targowisko group, the situation was not different. The excavations of this extensive settlement with longhouses yielded about 300 stone objects, including 31 tools made of raw materials other than flint (Wilczyński 2014, 461). Especially the site with a deposit of large grinding plates of sandstone attracts

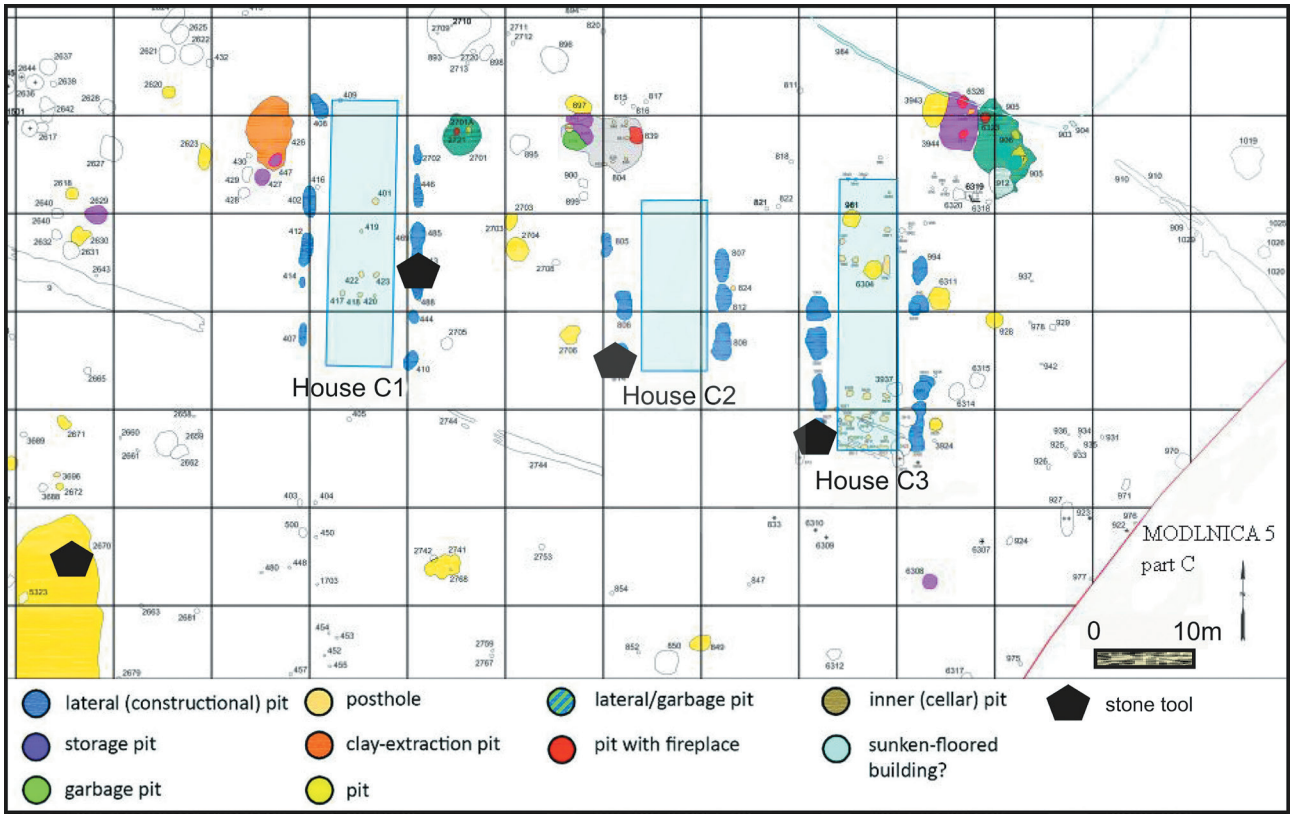

Fig. 11. Plan of the Modlnica 5 settlement (fragment) showing the location of the longhouse (after Czerniak *et al.* 2011; with modifications by M. Szydłowski – only stone tools from LBK objects are included in the map).

attention. Although the site was dated to the Music Note phase of the LBK, the longhouses were associated with the Zofipole phase (Zastawny and Grabowska 2014). Only some stone artefacts were associated with longhouses.

Modlnica 5

During excavations of the Modlnica settlement, site 5 (Fig. 11), a few kilometres northwest of the above complexes, 116 LBK stone objects were found (Czerniak *et al.* 2011). Three different zones (A, B, and C) were distinguished at the site, each with a different chronology, covering the period from the Zofipole to the Music Note and the Music Note/Želiezovce phases (Czerniak *et al.* 2011, 12–13). Zone A has been assigned to the Zofipole phase, but there is a likelihood that it may be chronologically broader. Some houses may be dated later, probably to the Music Note phase (Czerniak *et al.* 2011, 23). Zones B and C are more or less contemporary (zone C is probably slightly younger than B). Both B and C comprise the settlement sector that was occupied somewhat later than zone A. In Sector C, significant amounts of pottery typical of the Želiezovce phase were found, suggesting an earlier subphase of settlement development (Czerniak *et al.* 2011, 25). It is far from conclusive to establish an absolute chronology by dating ceramic features. However, the period between ca. 5100 and 4900 BC can be accepted as the extent of this settlement, but it was not a continuous settlement. The successive phases were separated by interruptions in settlement (Czerniak *et al.* 2011, 31; Kadrow *et al.* 2021, tab. 1).

Stone artefacts were grouped in "common" zones in most cases, with no assignment to a specific farmstead. Some individual objects were associated with the western area of house C2 and C3 and the eastern of house C1. In Zone B, excavations on the west wall of house B1 revealed a distinct household area with several stone objects and significant flint and ceramic remains. The situation was similar at houses A2 and A4. However, it should be emphasized that the number of stone finds was minimal compared to other sources discovered at this site. Stone artefacts were found mainly in fragments, damaged and worn. Of the many LBK settlements with longhouses in Lesser Poland, this settlement was poor in stone artefacts. The only complete quern (Fig. 5) was found in Zone C in a group of household features in a "common" area some distance from the farmsteads. Fragments of two

others were found in the household areas of houses A2 and C1. One piece of a quern was recovered from group Aa (Czerniak *et al*. 2011, tab. 4). In other words, for each phase of settlement development there were one or two finds of querns. For comparison, nine fragments of adzes made of amphibolite shale and one drill pin, indicating processing of raw material in Zone B, were recovered from the site discussed. The drill pin (Fig. 8) was found together with polished stone fragments and a slab in a waste pit.

With regard to the stone material distribution of the settlement Modlnica 5, we had an opportunity to compare it with a cemetery at Modlniczka 2, about 250 m to the west of Zone A. All graves revealed were cremations. Stone artefacts were recorded in 14 of 39 burials (Czekaj-Zastawny and Przybyła 2012, 31–43) and included 24 blade tools (adzes) or fragments and an unknown stone object with a hole. Therefore, a significantly greater number of adzes has been discovered in several graves compared with extended settlements containing longhouses. Most adzes found in graves were whole tools, while in settlements, they were mainly in fragments and destroyed. This simple fact illustrates that the adzes must have been valuable economically and for the spiritual sphere. Obvious differences were also observed in the extent to which graves included goods, with the majority lacking them. It has been noted that the graves where stone tools were placed also contained other goods in most cases Czekaj-Zastawny and Przybyła 2012, 31–43, tab. IV).

Raw material perspective

The respective groups of stone artefacts discussed above may also illustrate the choice of raw material by LBK stone artisans. Almost all of the adzes were made of amphibole shale from the area of the present-day Czech Republic (Krystek *et al*. 2011), with the exception of one artefact made of siltstone from the Targowisko 10/11 site (Wilczyński 2014, 464) and one adze made of unidentified raw material from the Modlniczka 2 cemetery (Czekaj-Zastawny and Przybyła 2012, 41). The consistency of the raw material was also observed in other types of tools at all investigated sites. These tools were almost all made of sandstone. The exceptions include two granite querns and one conglomerate quern found in Brzezie 17. Similarly, all but one (amphibolite) of the stone plates from Brzezie 40 were made of sandstone. In the group of tools, which includes pounders, grinders, pounders/grinders, 45 pieces were made of granite, three of quartzite and sandstone. It is also worth mentioning an aplite piece with an opening from the Modlniczka 2 cemetery (Czekaj-Zastawny and Przybyła 2012, 42). The comparable uniformity of raw material in the production of the respective tool classes was observed at all sites. However, it is important to note that sandstone is a widely used raw material in this region. We should take these characteristics into account when thinking about why this raw material, which is hardly suitable for the production of tools, gained such popularity (Szydłowski 2017). On the other hand, amphibole slate is the best material for the

Table 1. List of stone tools from the sites included in the study.

Site No.	Number of stone objects	Number of stone tools	Adzes, including fragments	Querns, including fragments	Grinding plates, including fragments	Grinders, pounders, pounders/ grinders	Others
Brzezie 17	619	more than 121	35	47	18	20	?
Brzezie 40	1100	70	20	4	32	4	10
Modlniczka 2 (settlement)	19	19	18	0	0	0	1
Modlniczka 2 (cemetery)	25	25	24	0	0	0	1
Modlnica 5	116	18	9	1	0	0	8
Targowisko 10/11	31	31	6	4	0	3	18
Targowisko 12-13	3600	83	9	2	1	9	62
Targowisko 14-15	278	16	5	4	6	0	1
Targowisko 16	9266	65	17	5	3	9	31
Sum	**15054**	**more than 458**	**143**	**67**	**60**	**45**	**more than 133**

production of adzes. It is also a raw material that, due to its technical properties, determines the production of specific tool shapes. Such tools are much easier to make from this raw material and are more ergonomic, with adzes being one of them.

Conclusions

The stone artefacts analysed in this paper are a highly sensitive diagnostic indicator of the household tasks performed in a settlement and the social relations depending on the find context. The results presented above, which include the analysis of several thousand stone artefacts from a few LBK settlements in Lesser Poland, can be considered statistically reliable. However, the number of artefacts considered for the present study was significantly reduced after the author conducted an analysis of use marks, which eliminated objects without evidence of processing and use, and a chronological selection, which allowed him to exclude all artefacts for which the LBK relationship was not proven.

The first revealing observation is that the rock material in LBK settlements containing longhouses is many times less than artefacts made from other raw materials such as pottery or flint. At Brzezie 40, for example, a 25-fold disproportion was found between ceramic and stone finds. It is unlikely that this condition is related to excessive erosion of the surface of the site. If this were the case, other artefacts would not have been recorded, particularly pottery, which is more susceptible to destruction than stone. Stone artefacts found in features and pits in settlements are recorded primarily along with pottery and flint. Osteological material or daub fragments are less frequently found. The most diverse site in this regard was Modlnica 5, where stone finds were discovered together with pottery, flint, bone, daub fragments and even an amber fragment and an anthropomorphic figure (Czerniak *et al.* 2011; Wąs 2021). Targowisko 12/13 differs significantly. In addition to stone artefacts, daub fragments were found in large quantities in the backfill of pits and other features. In the other discussed settlements, daub with stone objects were found only rarely.

The correspondence between stone artefacts and longhouses at the sites studied is difficult to find and not remarkably repeatable. Nevertheless, some firm conclusions can be drawn, and some patterns become apparent, despite the limited data which is ultimately available.

In this paper, we were mainly interested in discussing the possible use of longhouses based on the distribution of ground stones. The presence of household zones was confirmed on the southwest corner of most of the houses and along their eastern and western walls. However, they were practically not found on the northern side. This absence suggests communication routes and a second entrance in the north.

In addition to the function of the longhouses, the question of the specialization of settlements (groups of houses in a settlement) was also raised. Specialized settlements can probably be identified, for example, by significant differences in the quantity of querns between two settlements of approximately the same age, located several hundred meters apart (the sites in Brzezie). In Brzezie 17, querns were found in large numbers, while in Brzezie 40, hardly any were found. This suggests a specialized settlement that was active in a group of settlements that would have been part of a much broader settlement community than individual villages. In contrast, typical production remains, a drill pin, and stone flakes were documented in the settlements where hardly any querns were found. Therefore, it can be assumed that Brzezie 17 could have been a village of farmers and Brzezie 40 a village of stone craftsmen. However, this opinion should be treated as a hypothesis that requires further investigation. It cannot be ruled out that there was only occasional increased activity in the settlement during this period, and not necessarily that it is the same as the specialized settlement.

Based on the context of the deposition of the stone artefacts at issue, the author identified two activity zones: "domestic/family" and "collective". The domestic zone was probably associated with the activities of an individual or a "family" that lived in a particular homestead. It is assumed that there would also be a communal area in the settlement some distance from the homesteads that served the general public. This zone would not be associated with a homestead. However, the proposed division into two activity zones is only based on the distribution analysis of the ground stone artefacts, leaving open the question of whether the use of other sources would confirm this division. At this time, the problem cannot be resolved (the statistical sample is too small), nor can the following questions be answered: Would some tasks be done for the needs of a particular household and others collectively for the entire settlement community? Can we speak of "house specialization" or "settlement specialization"? Do the fragments of querns deposited under the house suggest that a "family" of peasants would have inhabited the house? Nevertheless, the above classification can be considered as a basis for discussions about the organization of LBK societies.

Stone tools were undoubtedly valuable commodities for early Neolithic manufacturers. Their value can be inferred from grave finds. As the grave goods suggest, adzes would have been such a necessary type of tool, as they were often placed in the grave, even in pairs, while the category of ground stones was absent from the Modlnica cemetery. Such an object as the adze may have served as a distinguishing mark of wealth and social status. These items were most often placed in the graves, along with other objects. However, several adjacent graves contained no items. Complete adzes are rare finds in settlements as they are almost always broken and only a few querns are completely preserved. The rather small number of querns and adzes in most of the sites discussed may indicate that the inhabitants took them with them when they left the settlement, perhaps as a symbol of the longevity of the extended family.

This article should be considered at this point as a preliminary contribution to further research and evidence gathering on the function and space of LBK settlements with longhouses and the social organization of LBK communities. It raises several questions and hypotheses that need to be developed and tested in future studies.

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