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## PATTERNS IN MATERIAL CULTURE: DATA FOR SOCIAL PRACTICES AND ACTIVITIES IN THE EARLY ALPC SETTLEMENT OF BÜKKÁBRÁNY-BÁNYA VII (NORTHEAST-HUNGARY)

### ABSTRACT

Füzesi A., Tutkovics E. K., Kalli A. and Faragó N. 2021. Patterns in material culture: data for social practices and activities in the early ALPC settlement of Bükkábrány-Bánya VII (Northeast-Hungary). *Sprawozdania Archeologiczne* 73/1, 439-476.

Bükkábrány-Bánya VII, an early ALPC settlement in Northeast Hungary, was just recently exposed to international research, but we would like to illustrate in our study how much promise its archaeological material has. We focused our investigation on these finds because the site contains a three-hectare excavated area and a well-defined settlement structure. Our first results are based on a quantitative examination of the many categories of archaeological finds. The first stage in our intra-site investigation involved the analysis of artifact fragmentation, as evaluated by the weight-to-frequency ratio, which indicated variances in depositional procedures. The spatial distribution of each find category was analyzed using kernel density, which revealed unique hot spots within activity zones. To split the settlement territory into spatial units, we employed the primary structural characteristics, such as rows of houses, empty spaces, and wells. The distribution and fragmentation data matched our theoretical spatial units well, providing an interpretive framework for the early ALPC settlement's social units.

Keywords: Neolithic of Northeast-Hungary, early ALPC settlement, settlement structure, intra-site analysis, distribution pattern of archaeological material

Received: 07.06.2021; Revised: 09.06.2021; Accepted: 16.11.2021

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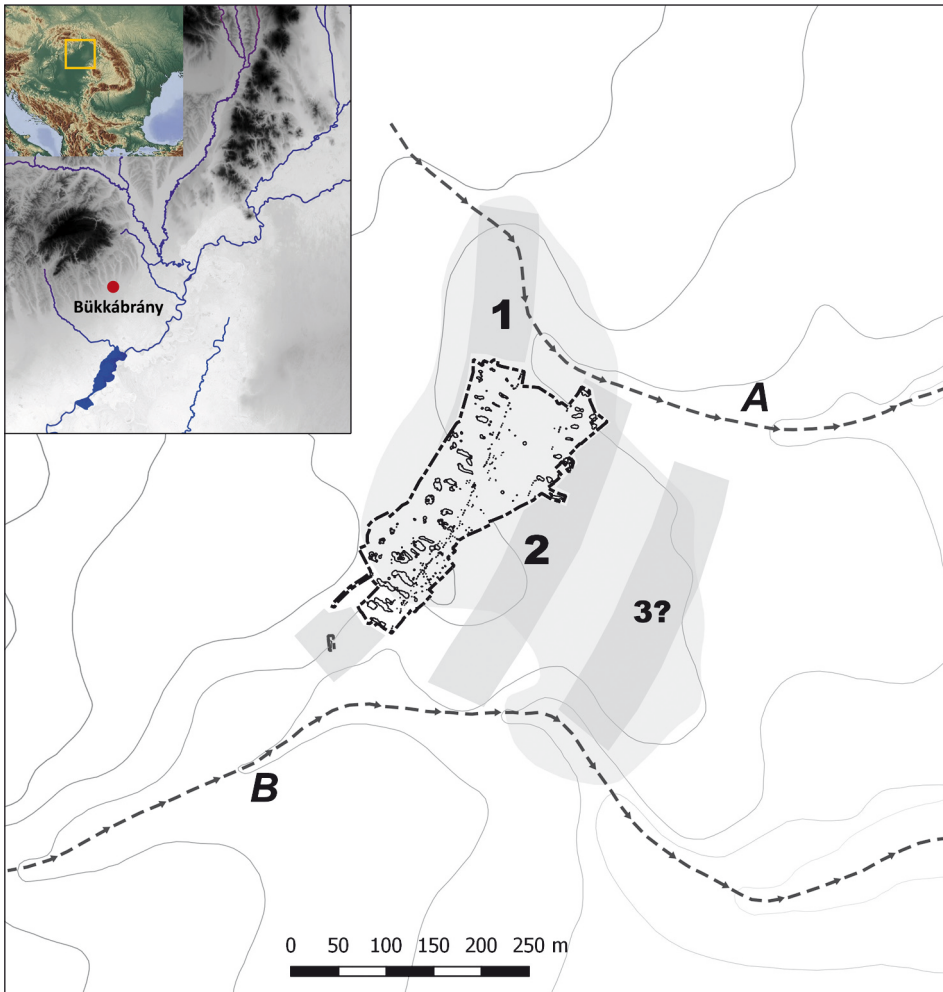
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On its way to Central Europe, the Danubian route, one of the principal pathways of European Neolithization, traveled through the Balkans and the Carpathian Basin. Alternative approaches, on the other hand, led to the establishment of unique cultural groupings in nearby regions. In Central Europe, the Linearbandkeramik (LBK) cultural setting provided the backdrop for Neolithization, whereas, in the Carpathian Basin, the Alföld Linear Pottery culture (ALPC) provided a similar backdrop. The formation of these two cultures was linked at numerous stages (Bánffy 2006; Whittle *et al.* 2013; Raczky 2019). These significant links have not yet been studied in full due to variations and challenges in local research histories, while key parts have been discussed (Raczky and Anders 2003; Domboróczi 2009; Kozłowski and Raczky 2010; Mester and Faragó 2013). The formation of common narratives and the recognition of local cultural units as a unified cultural complex are both positive outcomes of the exchange of ideas at local and regional conferences (Kozłowski 2009; Kozłowski and Raczky 2010; Virag 2015).

## 1. INTRODUCTION – BÜKKÁBRÁNY-BÁNYA SITE VII

The relevance of rescue excavations has expanded in Hungary since 1990, as large economic investments have increased. Apart from highway construction projections, during which rescue excavations were undertaken to preserve archaeological data river regulation programs and mine extractions took away a considerable portion of the land previously inhabited by archaeological sites. The Bükkábrány lignite mine was a major undertaking, with a situation comparable to that of the Aldenhoven plateau (Lüning and Stehli 1994): years of mining damaged the environment throughout several square kilometers, but archaeologists working there were able to document monuments, artifacts, and date from recent millennia. Although surface mining at Bükkábrány began in 1985, due to the state of Hungarian heritage management, archaeological research has only been conducted since 2007 (Kalli and Tutkovics 2017, 4, 5, fig. 2, 3, Table 1).

Between 2011-2012, András Kalli and Eszter Tutkovics excavated a three-hectare section of Bükkábrány-Bánya Site VII (hereinafter Bükkábrány, Kalli and Tutkovics 2016). The topographic examination identified the site, and approximately one-third of it had been excavated over two seasons (Fig. 1). The landscape has since been destroyed as a result of the mining method used in the area, making further observation impossible. The earlier geographical databases, aerial photos, and other mappings should be used in analyses of this site. We reconstructed two waterways that once encircled the settlement based on the topographic conditions of the Bükkábrány micro-region (Fig. 1). Due to the destruction of the contemporary landscape, the nature of the streams (A and B) – periodic or constant – during the Neolithic can no longer be determined. However, it is important to note that the size of the site, as identified by pedestrian survey, corresponds to the plateau, flanked by the a valley on each side – on the northeast and the southeast.



**Fig. 1.** Site plan of Bükkábrány-Bánya VII – grey polygon: the excavated area within the entire archaeological site, 1-2 – house rows, 3? – possible house row, A-B – waterways reconstructed based on relief

The majority of the 490 archaeological features discovered were dated to the Middle Neolithic and Roman Empire periods. Of these features, 254 had ceramic that could be linked to the early ALPC. The unearthed features belonged to a row-house community, with buildings that are now difficult to recognize as distinct components (Fig. 2). The row of residences in the southeast is shorter and less well-known. The axially symmetric layout of the village was corroborated by the spatial position of the features, even though the settlement units were only partially identified. Only two rows of homes are known to have



Fig. 2. The early ALPC features of Bükkábrány-Bánya VII

existed at the Bükkábrány site (1-2), but another village unit (3?) may have existed in the southeastern half of the site (Fig. 1). Both early ALPC and Roman-period village remnants have been identified in the southwestern third of the excavated area, the highest part of the site. However, only Neolithic features were found in the east. As a result, we can assume that the unexcavated portion of the settlement in the southeast belongs to the former rather than the latter. If this is correct, the third row of houses (Unit 3) could indeed have existed.

Due to the poor observation conditions and pedological qualities of the area, the number and size of buildings are unknown; only parts of the LBK longhouses remained. Structural elements indicated a substantial chunk of the expected 43 homes (30 buildings). The

postholes, observed in triplets, only accounted for one row per building. Despite this, 194 postholes were dug. Based on analogies, the deepest row of postholes was built in the frontal third of the longhouses, or as their facade (Oross 2009; Rück 2009). Large clay pits close to and between the buildings identified 13 other dwellings, which were utilized primarily as construction phenomena and secondarily as depositional locations. The 31 long pits and 10 pit complexes held a large amount of the material. Based on their long pits the remaining buildings were assumed. The settlement's structures were placed in two rows, side by side. Four of the suspected dwellings were found behind the buildings in the first group, whereas nine were uncovered behind the structures in the second category.

Only 23 intramural burials discovered in the entire excavated area. This number corresponds to sites with similar ages (Domboróczy 1997; Kalicz and Koós 2014). The deceased were buried in separate grave pits, but in some cases, the skeletons were also placed in the fills of the large pit complexes. These examples were found in the southeastern row of houses. More than half of the graves were concentrated in the southwestern part of the settlement, in front of three adjacent houses (Fig. 2). The burial rite also corresponded to the early ALPC practice. Without exception, the skeletons lay on their left sides in a contracted position, and there were no artifacts in the graves. Unfortunately, the remains were in a very poor condition; in only seven graves, nearly complete skeletons were preserved, while in eight cases, the skull and long bones remained, in seven graves only the long bone fragments preserved, and one burial had only skull fragments.

Among the discovered phenomena, the wells are of particular importance, as they contain previously unknown equipment developed in the LBK-ALPC milieu. The internal structure of these features, which were 7.5-7.7 m deep, was not observable in detail. However, based on their size and their diameter (2.5-3.0 m), they can be identified as tubular wells (Király and Tóth 2015; Füzesi *et al.* 2015). The wells excavated in Bükkábrány were significant because of their location within the site. Two of them were discovered within the central axis of the settlement, dug 55 m apart in the empty, 50-m-wide space between the two rows of houses (Kalli and Tutkovics 2017, 6-7, fig. 4; Faragó *et al.* 2015). In a separate trench, a third installation was discovered on the southwestern outskirts of the settlement (Fig. 10). Wells became increasingly important sources of water in Neolithic communities, as well as in the internal layout of their settlements. Not only did well numbers increase, but so did the practices and rites associated with them (Hajdú 2007; Sebők *et al.* 2013). The Bükkábrány wells were located in the community space, indicating that they were used jointly.

The ceramic material discovered at the site demonstrates the characteristics of the early ALPC style: low and medium-high pedestals, bowls and pots with rectangular rims, simple geometric patterns, wide incised lines, filling with black painting, which rarely remained in Bükkábrány (Fig. 3-5; Domboróczy 1997; Kovács 2007; Nagy *et al.* 2014). Various clay figural representations were distinguished (Fig. 6-7): triangular-headed idols, animal figurines with square bodies, and so-called centaurs (embodying a combination of

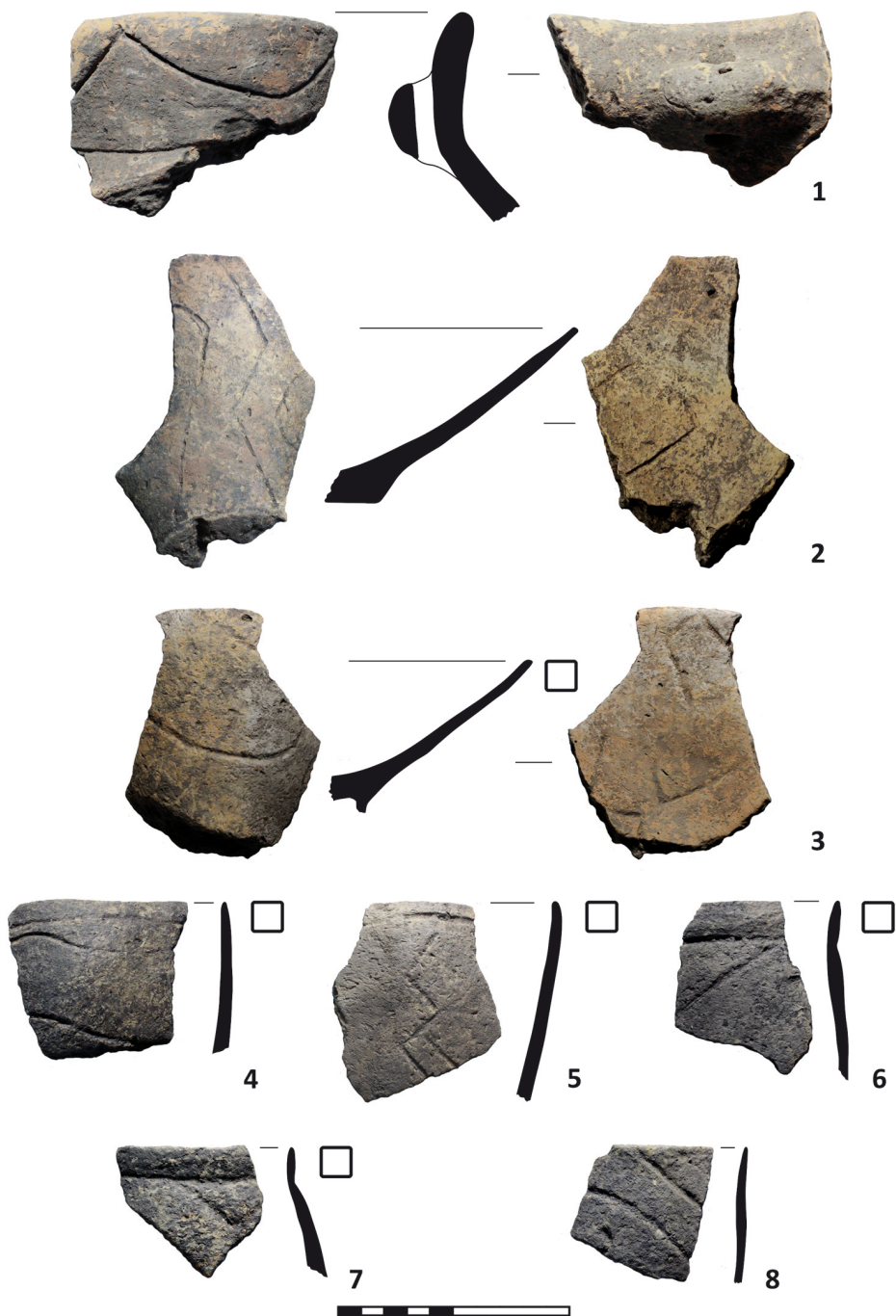


Fig. 3. Early ALPC pottery from Bükkábrány-Bánya VII (selection)



Fig. 4. Early ALPC pottery from Bükkábrány-Bánya VII (selection)

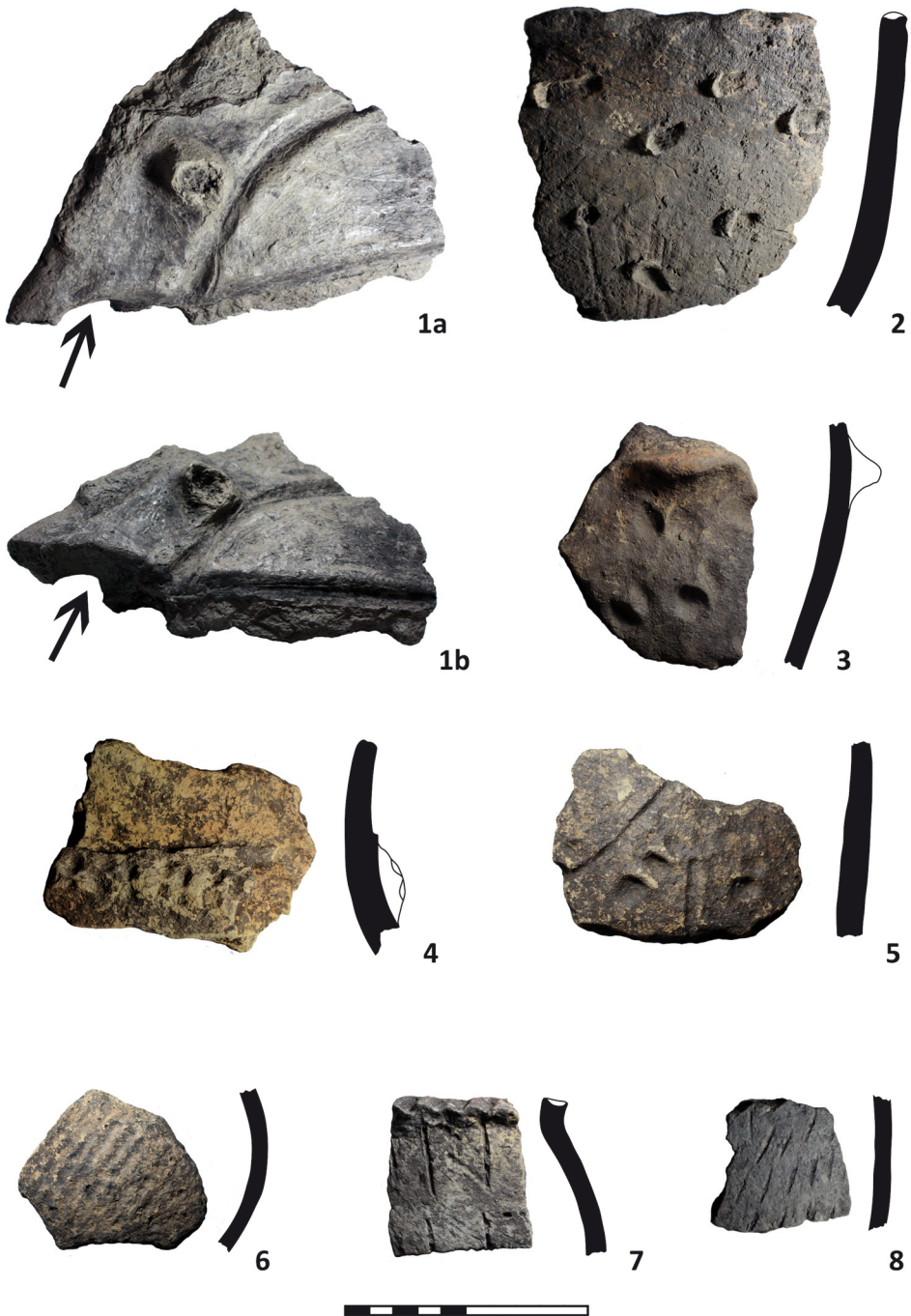


Fig. 5. Early ALPC pottery from Bükkábrány-Bánya VII (selection)





Fig. 6. Antropomorhic representations from Bükkábrány-Bánya VII (selection)



Fig. 7. Centaur figurines (1-2), curved clay objects (3-16), and clay beads (17-18) from Bükkábrány-Bánya VII (selection)

Table 1.  $^{14}\text{C}$  data from Bükkábrány-Bánya VII

Sample ID	Sample	$^{14}\text{C}$ age (yr BP) ( $\pm 1\sigma$ )	Calibrated age (cal BC) ( $\pm 2\sigma$ )
DeA-9195	BAVII 456	6312 $\pm$ 38	5370-5210
DeA-9196	BAVII 314	6302 $\pm$ 35	5350-5210
DeA-9534	BAVII 258	6378 $\pm$ 36	5470-5300
DeA-9535	BAVII 215	6209 $\pm$ 35	5300-5050
DeA-9536	BAVII 254	6249 $\pm$ 44	5320-5060
DeA-9197	BAVII 134D	6305 $\pm$ 35	5360-5210
DeA-9537	BAVII 20	6341 $\pm$ 35	5470-5220
DeA-9538	BAVII 208	6441 $\pm$ 36	5480-5340
DeA-9539	BAVII 134E	6318 $\pm$ 45	5470-5210
DeA-9543	BAVII 312	6291 $\pm$ 35	5340-5210
DeA-9198	BAVII 325	6340 $\pm$ 37	5470-5220

the two) made up a characteristic segment of early ALPC assemblages (Domboróczki 2005; Csengeri 2013). With the sites Füzesabony-Gubakút (hereinafter Füzesabony, Domboróczki 1999), Mezőkövesd-Mocsolyás (hereinafter Mezőkövesd, Kalicz and Koós 1997), and Hejőpapi-Szemétlerakó (hereinafter Hejőpapi; Domboróczki *et al.* 2017), the assemblage can be classified into the typochronological group of the early ALPC (ALPC<sub>1</sub>). We have 11 AMS dates from Bükkábrány that allow us to estimate its lifespan as 250-280 years, between 5470-5210 BC, though two outlier measurements move this period up to 5050 BC (Tab. 1). A significant portion of the dated samples were collected from the western third of the northern row of houses (Fig. 2), preventing us from conducting a more detailed intrasite analysis. As a result, for the time being, the archaeological record of the settlement can only be interpreted as imprints of long-term activities spanning 2.5-3 centuries.

The finding of a similarly built ALPC hamlet (Site XIA) approximately 240 meters east of Site VII added to the relevance of the phenomenon. In the Bükkábrány micro-region, essentially in the valley of the Csincse stream, the presence of two parallel rows of buildings facing each other, along with a well in the space between them, proved to be repeating elements (Kalli and Tutkovics 2017, 6-7, Fig. 5).

## 2. ANALYSES OF THE ARCHAEOLOGICAL ASSEMBLAGE OF BÜKKÁBRÁNY-BÁNYA VII

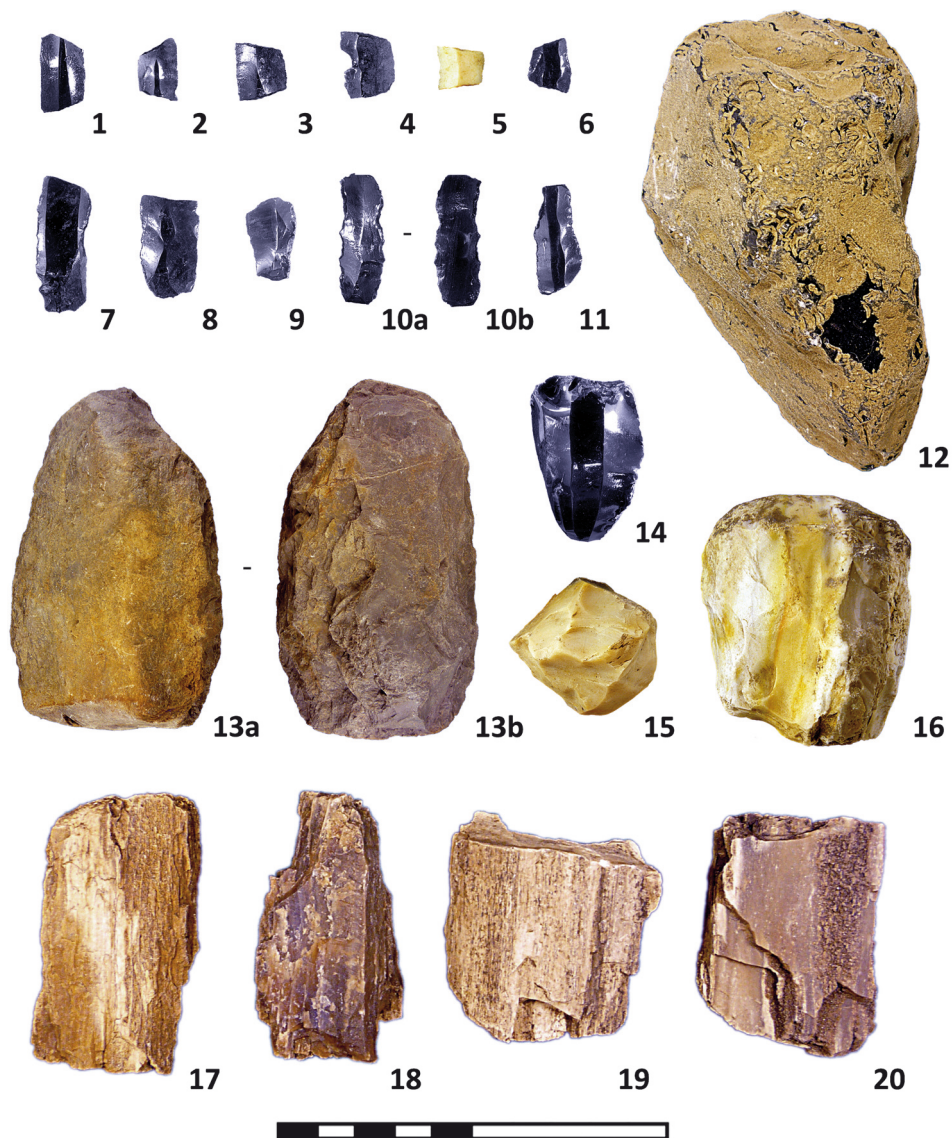
Although a large amount of material was excavated at the Bükkábrány site, only a partial analysis has been conducted for the time being due to the limited resources available. Nonetheless, a simple comparison of the frequency and weight of the find types produced results that can be used to better understand the internal structure of the settlements as

well as the functioning of early ALPC communities. Salvage excavation methods did not allow for the detailed intra-site analysis that could be achieved with systematic find collection in sampling units, ideally per square meter and level. The reconstruction of the deposition process in a feature (Füzesi *et al.* 2020), as well as modeling the household activities based on the features around the buildings (Tóth *et al.* 2020), are important methods of archaeological induction. Thanks to the large scale of space and time, data recorded by closed features provide a less detailed, but more broad insight into the operation of a settlement.

For each type of find, data collection was simplified and finds were classified as ceramics, animal bones, chipped and polished stone tools, quern stones, and so on. We did not differentiate between the specific types that would be required for a more detailed analysis within these categories (*e.g.* fine and coarse ware in pottery). Because the archaeological material is still unrestored and the storage conditions have allowed for further fragmentation, the frequency data in all groups is a maximum value, which is what is available at the moment. We corrected this bias by collecting weight data. The evaluation also included measured values and ratios computed from the two base data sets. Aside from statistics, a series of GIS maps were created. The Kernel density method was used to generate distribution patterns from counted and weighed data.

The size of the assemblage is well presented by the 224,586 fragments of ceramics, weighing 4,851 kg. There is a large amount of daub (45,291 pieces, 1,420.0 kg), which is common in Neolithic sites. However, the extremely low proportion of animal bone material (5,698 pieces, 74 kg) is striking, particularly when compared to other Middle and Late Neolithic collections in Eastern Hungary (Bartosiewicz 2005, table 6.1; Bickle and Whittle 2013, 13-17; Raczky *et al.* 2015, 32-34, tab. 3-4; Füzesi *et al.* 2020, 152, fig. 9). This phenomenon can be explained by the high soil acidity of the microregion, which accelerates bone decay (Open access data of pedology: AGROTOPO ([mta-taki.hu/hu/keptar/agrotopo](http://mta-taki.hu/hu/keptar/agrotopo))). The lithic collection includes 2,365 (16.0 kg) chipped stones, 169 (11.6 kg) polished stones, and a considerable number of quern stones (1,190 pieces, 377.0 kg). Unworked stones (437 pieces, 22.7 kg) were also discovered close to their sources. We observed a large number of other rocks (silicified wood) that community members experimented with among these raw materials, in addition to rocks suitable for grinding (Fig. 8; Faragó *et al.* 2015). Due to the acidic soils mentioned above, the number of bone tools (28 pieces, 398 g) and shell fragments (58 pieces, 217 g) was extremely low. Finally, ochre, a popular mineral pigment in the Neolithic period, was discovered in significant quantities (332 pieces, 9.8 kg).

Differences in the use and abandonment of each type of object are well presented by the number of features in which they appear. Almost all features contained ceramic (254) and daub (256) fragments. Less than half of the features yielded animal bones (96), chipped stones (123), and querns (98). Polished stone tools (51), unworked stones (60), and ochre (54) were found in less than a quarter of the features. Only a few cases of bone tools (7) and mussel shells (8) were registered in the discovered material. The hotspots in



**Fig. 8.** Chipped stones (1-12, 14-16), preform of polished stone (13), and unworked stones (17-20) from Bükkábrány-Bánya VII (selection)

the settlement can be identified using spatial differentiation and frequency and weight data separately. However, based on the average weight per find, their ratio allows for the evaluation of the degree of fragmentation and characteristics of the deposited material, as well as the deposition process itself. Boxplots (Fig. 9), which show the median and outlier

	Pottery	Daub	Animal bone	Chipped st.	Polished st.	Quern stone	Bone tool	Mussel	Ochre	Unworked st.
N	254	256	96	123	51	98	7	8	54	60
Min	0.6111111	0.3333333	0.2666667	0.6666667	2	2	1	1	0.5	3
Max	179.5547	969.009	38	44	721	4035	52	7	109.2	980
Sum	4142.732	7688.267	744.6933	871.9142	4724.783	38104.09	111.9432	31.91504	1744.439	4894.442
Mean	15.57418	29.12222	7.1225543	6.506823	85.95015	362.8961	15.99188	3.98938	29.07398	76.47566
Std. error	0.9766962	3.657387	0.7225543	0.5847883	17.25421	51.2264	6.406509	0.8417728	4.782596	18.50939
Variance	253.7468	3531.391	54.29681	45.82496	16373.93	275535.1	287.3035	5.668651	1372.393	21926.23
Stand. dev	15.92943	59.42551	7.368637	6.769414	127.9607	524.9144	16.95003	2.380893	37.04583	148.0751
Median	13.42256	11.60865	5.112245	4.920455	44	224.2857	10.125	4	16	25.77381
25 prentil	6	2.45	1.666667	2.766667	20.8	101.5571	6	1.696023	8.0375	12.375
75 prentil	20.499	30.80342	10	7.628632	100	475	17.81818	6.285714	35.33333	62.78125
Skewness	5.38592	5.403594	1.9139	3.220886	3.605338	4.735645	1.993965	0.003160113	2.67429	4.282827
Kurtosis	46.9856	36.83076	4.563488	13.01384	14.91249	28.18773	4.476219	-2.093329	7.978825	22.48063
Geom. mean	10.80191	9.389071	4.19785	4.596544	43.06942	191.9387	9.625465	3.250785	15.40136	30.77967
Coeff. var	102.281	204.0555	102.9066	104.0356	148.9557	144.6459	105.9915	59.68077	127.4192	193.6238

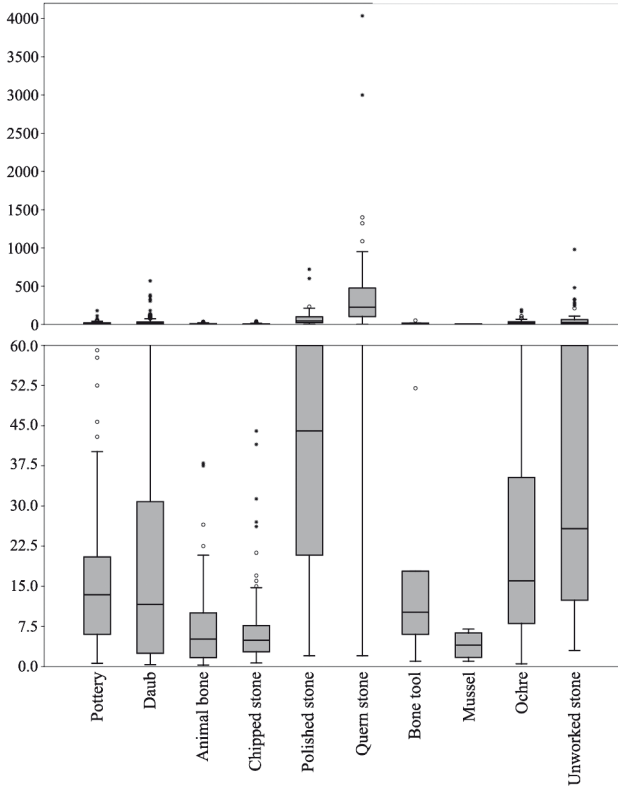


Fig. 9. The ratio of weight and frequency by different find types: univariate statistics (1), and boxplot graph (2)

values, among other details, were used to evaluate these data sets for all ten find categories. The ratio indicates the degree of fragmentation, implying the activities in which the objects were involved. Besides the obvious results (median weight is the highest among quern stones, 224.0 g), finer details were revealed. The median is higher for ceramics (13.4 g) than for daub fragments (11.6 g), *i.e.* the rubble of the buildings were not treated according to later Neolithic practice (creating a new context by depositing the remains), but they accumulated naturally in the features, during a long weathering process. Daub fragments

found in several postholes indicate the same. The plunging values of animal bones, bone tools, and shells (5.1, 10.1, and 4.0 g respectively) confirmed the already mentioned strong taphonomic loss. The median of unworked stone (25.7 g) falls between the values of chipped and polished stones (4.9 and 44.0 g), far below the median of the quern stones, referring back to the knapping attempts with the Zemplén silicified wood. Outliers on the boxplots could represent hotspots for specific types of deposition. The boxplots showed extreme values in various zones of settlement, and these are not always identical with segments that are significant in terms of weight or frequency.

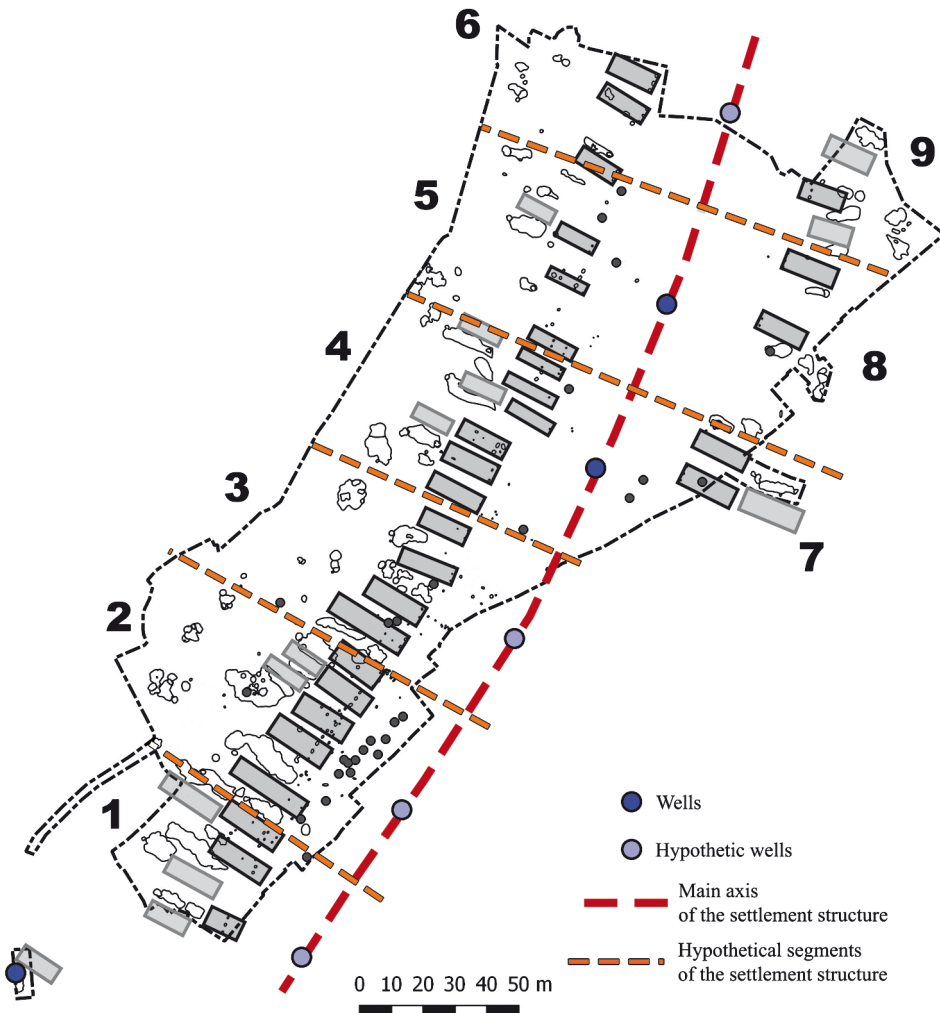


Fig. 10. The intrasite analyses of the settlement structure in Bükkábrány-Bánya VII – 1-9 spatial units based on the main structural elements

Bill Hillier interpreted space as the result of the interaction of social actors and physical phenomena, strengthening the link between structure and process even further (Hillier 2007). This approach and associated aspects of research, such as differentiated spaces, paths between them, and the degree of spatial integration, are well suited to archaeological studies. The central space is the most important access path in the early ALPC settlement of Bükkábrány, and the row of wells can be identified as important locations. For further site analysis, our hypothesis assumed that the spatial arrangement of the individual elements in the regular settlement structure was also consistent. Despite working with a limited data set, we set up a row of wells on the central axis at a distance of 55 m apart, and based on these nodes, we divided the settlement area into equal-sized segments (Fig. 10). While the “staging area” and the wells were the physical focal points of the settlement, the existence of a central organizing principle allowed for the metaphysical permanence of this structure. Structure and process were linked in the establishment of these settlements, so these two approaches can be used together in our reconstruction: spatial segments delimited by settlement structure and processes reconstructed by finds.

### 3. TRENDS IN DEPOSITIONAL PRACTICES – HOTSPOTS IN THE SETTLEMENT

The spatial relations of the data taken from the ten find types present a relatively diverse picture of the settlement and its activity patterns. The rarity of bones and similar materials can be explained by the previously mentioned acidic medium. The frequencies of the other finds were determined by the former significance of the given object type and the intrasite spatiality of the related activities.

As a raw material for construction and pottery, clay played a fundamental and versatile role in the functioning of households in South-Eastern Europe and the Carpathian Basin (Bánffy 2019, 134). A waste management process covering the entire settlement area can be reconstructed using ceramic material and the remains of destroyed houses (Fig. 11: 1, 2). The finds of the second examined group revealed special functions and activities that, despite their rarity, played an important role in the community’s life. Quern stones were used to crush grain for food, but they were also used to make bone tools and to pulverize ochre paint (Kaczanowska *et al.* 2016; Řídký *et al.* 2014). Chipped stones indicate lithic tool production areas or have been used as tools for a variety of purposes. These two types of finds are distributed in the same way that ceramics are. Polished stone axes have become important tools in the creation of various constructions such as buildings, in addition to working hard organic materials (wood, animal bone, *etc.*) (Weiner 2013, 832). Based on specific contexts (*e.g.* burials) and symbolic representations (*e.g.* the “Axe God” of Szegvár-Tűzköves), this artifact type served as an important sign in material culture communication (Makkay 2005; Ilon 2009; Hedges *et al.* 2013, 377-380; Siklósi 2013, 230-232; Zsiga-



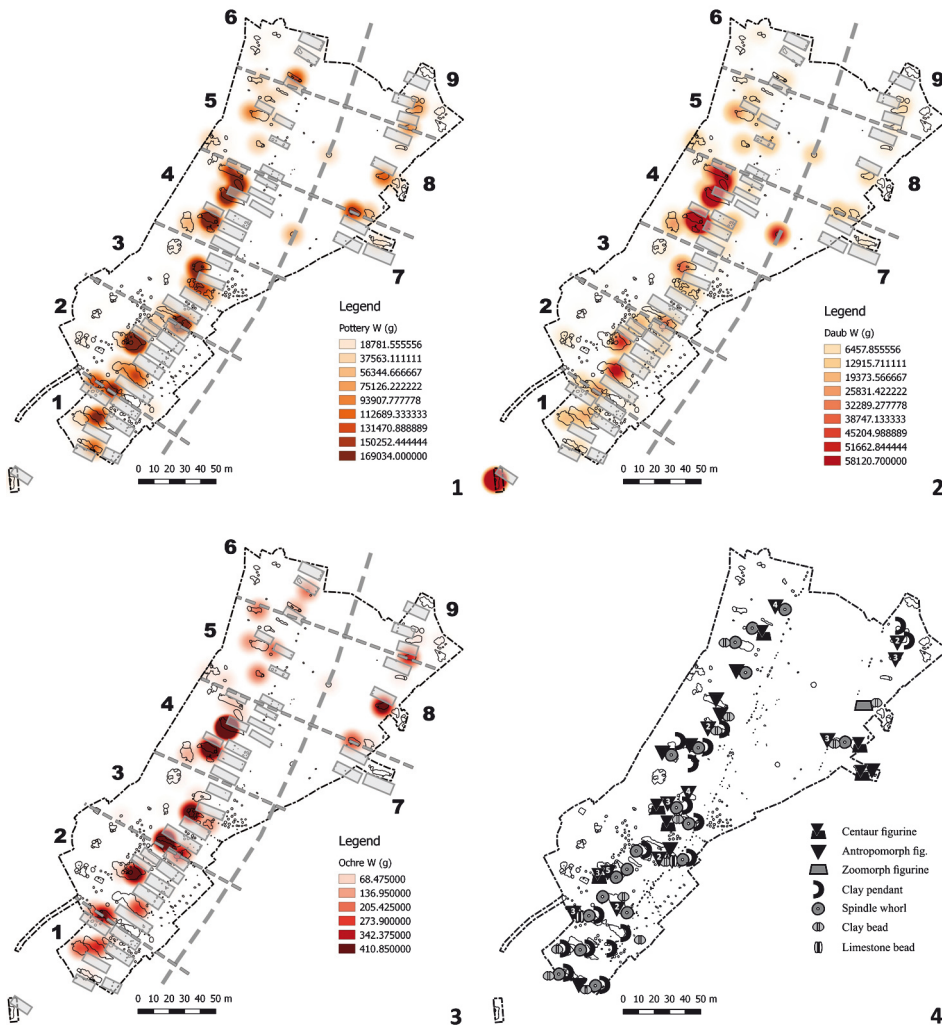


Fig. 11. Distribution patterns of the archaeological record: pottery (1), daub (2), ochre (3), and special artefacts (4) – Kernel density (1–3) fitted to spatial units

Csoltkó *et al.* 2021, fig. 24.2). The majority of unworked stones were made from a unique raw material (silicified wood) that possibly originated in the Zemplín Mountains. Members of this community experimented with this raw material based on lithic shatter, but the lack of finished stone tools or other secondary treatment (retouch) proved them unsuccessful (Faragó *et al.* 2015, 29-30). Bone tools served a variety of functions in Neolithic activities (Raczky *et al.* 2015, 35-39), and mussels as a source of protein and raw material for lime is a relatively common occurrence in Neolithic deposits in Eastern Hungary

(Gulyás *et al.* 2007; Füzesi *et al.* 2020). As a pigment (and a component of the Neolithic burial rite), ochre also had a strong symbolic meaning, which was evidenced by its use with anthropomorphic objects and decorated vessels (Borić 2015; Bánffy 2017).

The spatial distribution of diverse archaeological materials (Figs. 11-13) can be used to support complex interpretations. First, we must locate the depositional hotspots in each category of material. There are three different sorts of distribution patterns that might be related to specific discoveries. The first type of distribution was discovered throughout the village; however, it was concentrated most heavily in the northern house row. This was the situation for pottery, polished stones, and chipped stones. The second type exhibited considerably more spatial variance, being significantly present only in a few long pits, and the spatial distributions demonstrated some kind of exclusivity. The data from quern stones, unworked stones, daub, and ochre formed such concentrated and diverse patterns. Animal bones, bone tools, and mussels made up the third category of material, which had undergone considerable taphonomic losses. They concentrated on certain settlement points in both the northern and southern home rows.

Further analyses of the first and third categories were unable to give useful information about intrasite practices. The former was widely used, whereas the latter was significantly modified, *i.e.* taphonomically damaged. The strong connections between specific finds of the third category, on the other hand, confirmed the taphonomic effect of acidic soil, which may be indirect evidence of different spatially separated activities (Yerkes *et al.* 2007). The scatter patterns in the second category served as a jumping-off point for further research. The quern stones were concentrated in the southern part of the northern house row and along the northern edge of the second row. In terms of spatial units, this refers to Segments 1-4 and 9. The unworked, natural stones displayed an opposing pattern, concentrating on the southern house row and the northern portion of the second row (Segments 5, 8, and 9). We can infer from this that certain (spatially or temporally distinct) groups of the community placed a higher priority on experimenting with the new lithic raw material and incorporating it into the spectrum of usable resources (Mester 2013). The presence of daub fragments was significant only in five long pits and in well no. 366. This means that this find was concentrated in the middle of the northern row, especially in segment 4, and in the distinct trench. The ochre distribution is partly similar to that of quern stone (concentrations in Segments 2-4, and 8).

We can summarize the distribution patterns by using spatial units as interpretative frames. Segment 4, in the center of the excavated area, had been a prominent, intense activity zone encompassing nearly the entire investigated spectrum. Ceramics, daub, ochre, chipped stones, and querns were the dominant finds in the northern house-row, with less and less intensity following to the southwest (segments 1-3). In contrast, the northeastern row (segments 5-6) and the southern row (segments 7-9) had different compositions and frequencies. Chipped, polished, and unworked stones were abundant in segments 5 and 6. Aside from a large number of quern fragments in segment 9, the southern row of houses

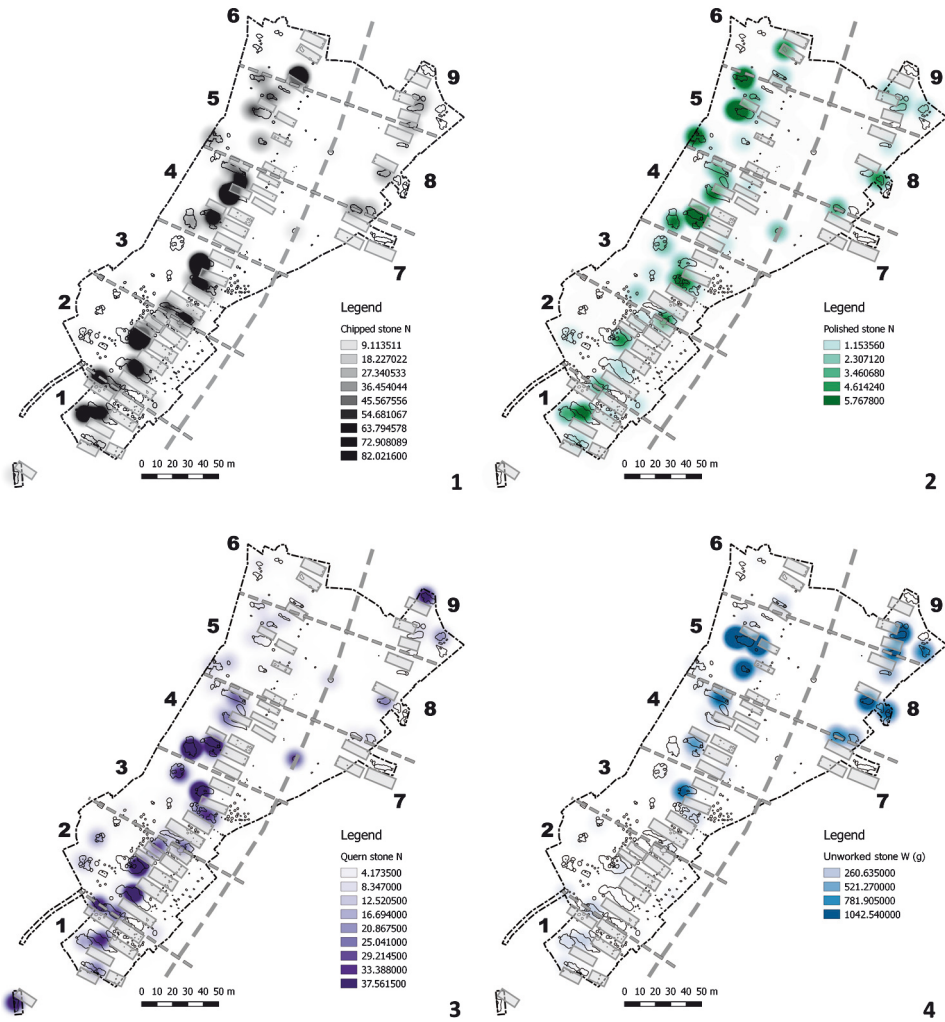


Fig. 12. Distribution patterns of the archaeological record: chipped stone (1), polished stone (2), quern stone (3), and unworked stone (4) – Kernel density fitted to spatial units

yielded mostly unworked stones, indicating local attempts at innovation. Bone tools were also found in a disproportionate amount here (segments 6, 7, and 8).

The most notable of these patterns is the attempt to use silicified wood as a lithic raw material, which sharply divides the settlement into a south-east and a north-east section (Fig. 12: 4). This division is also visible in the distribution of ochre, which, as a raw material of symbolic significance, is most likely the residue of a traditional habitus, contrary to the previous, innovative attitude (Fig. 11: 3). The two patterns fit well together. In practice,

the data of chipped stones can be compared to the data of unworked stones shattered by strong blows, if the latter is interpreted as an attempt to replace the former. Even in segment 6, where the incidence of the former is low and the latter is high, the data on chipped and unworked stones (Fig. 12: 1, 4) perfectly balance each other. More types of finds could be associated with the concept pairs of the practical (chipped stone, unworked stone) and the symbolic (ochre), as well as tradition (chipped stone, ochre) and innovation (unworked stone). Adding to this, our spatial observations suggest that the northern half of the settlement preferred innovation, while the southern half preferred tradition in its various practices.

Special artifact types, which are usually considered symbolic and have always received a lot of attention in archaeology, are also suitable for studying the differences between the two parts of the settlement. Anthropomorphic and zoomorphic objects (49 pieces, Fig. 6-7) stand out among the material of the Bükkkábrány site. Their distribution (Fig. 11: 4) is fairly even, with centaurs concentrated in the southwestern half of the area (segments 2-3). Anthropomorphic figurines were also found in greater numbers in these segments. Only in segment 8 did a zoomorphic fragment appear. A relatively large number of fragments of curved clay objects (37 pieces) with one end drilled (4 pieces) were found (Fig. 7). These curved artifacts were typically discovered as fragments smaller than 5 cm in length, with missing ends. Based on the drilled specimens, we can identify them as clay pendants, which are similar in shape and size to boar tusk pendants. We can interpret them as clay replicas of these popular late Neolithic grave goods (see *Spondylus* pendant imitations, Siklósi 2013, 228-229), or as symbolic artifacts made of clay and, later, wild boar tusk. The distribution pattern of these objects (Fig. 11: 4) is similar to that of ochre, but it also fits well with the chipped, quern, and unworked stone trend.

The trends described do not imply that particular find types and related activities were absent from the given segment and, thus, from the operation of the group assigned to that segment. The aggregated material residues of short-term actions reveal long-term trends, qualitative differences between activity zones, and strategic differences in the groups' subsistence in each segment. These are the results of the settlement's long-term operation, and the differences were caused by different intra-site groups preferring different activities. The density distribution fits well to the spatial units of the settlement in certain cases (segment 4 in almost all cases), but the rigid geometry of the boundaries would have to be modified elsewhere (separation of segments 7 and 8). Of course, we did not intend to demarcate actual household units, but rather to investigate whether the organizing principles recognized in the settlement structure were related to the activities indicated by the material, *i.e.*, whether the structures demonstrably influenced the processes.

Outliers in boxplots (Fig. 9, 13: 4) can be used to detect diverse depositional practices, particularly deliberate operations, in addition to highlighting remarkable degrees in fragmentation. While daub fragments were concentrated in segments 1-4, the size of the fragments in the opposite half of the settlement (segments 4-9) was much bigger. Many large daub fragments were discovered in segment 4 at the intersection of these zones, indicating

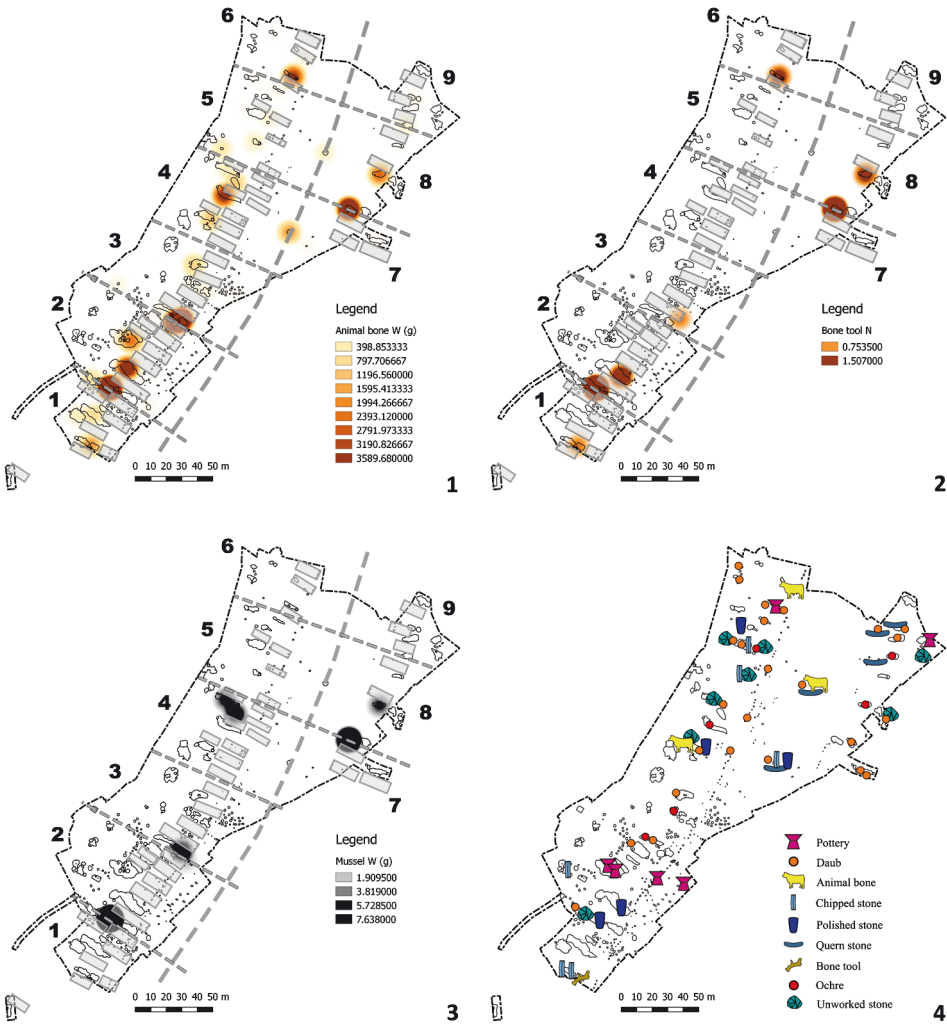


Fig. 13. Distribution patterns of the archaeological record: animal bone (1), bone tool (2), mussel (3) – Kernel density fitted to spatial units. (4) Special depositional locations identified by fragmentation of different archaeological materials (different icons show the outliers of the ratio of weight and frequency)

deposition immediately after destruction. The majority of the dwellings did not burn, and the daub portions that did slowly burn were heated in additional locations. Although the fire had a significant role in the settlement’s northern reaches, deposited dwelling remains were only discovered in segment 4. Even though purposeful deposition of house ruins in ALPC long pits was rare (Csengeri 2013, 92, Fig. 1; Füzesi 2016, Fig. 13), it was a common practice in early ALPC societies. In the Late Neolithic, the Bükkábrány assemblages

marked a transition between spontaneous disintegration or site formation and purposeful house-burning or ritual.

Aside from the main depositional locations, such as long pits, special features may be of interest in boxplot analyses. Significant ceramic fragment accumulation was observed in segment 2, where features such as a long pit, a burial, and a post-hole were affected. A long pit and a post-hole are responsible for the concentration of ceramics in segments 6 and 9. The 2-3 larger ceramic fragments, without matching edges, that were placed in the post-holes may be assigned a stabilizing, supporting role during the period of post erection, rather than a symbolic role, *e.g.* the founding rite (Russell *et al.* 2009). Extreme values of weight were also obtained from post-hole 497, where two nearly intact quern stones were deposited. Similarly, a 1.4 kg fragment of quern stone was discovered in one of the post-holes of the adjacent building (no. 465). The above-mentioned practical, stabilizing role is conceivable in these cases, but the strong symbolic meaning of querns and an associated founding rite cannot be ruled out (Faragó 2019, 314). In both LBK and ALPC cultural contexts, the deposition of querns is an activity that combines practicality and symbolism (Beneš *et al.* 2015; Hamon 2020; Kaczanowska *et al.* 2016).

The main focus of the intrasite activities was the production of various tools. The different stones in the examined find types can be used to evaluate the spatiality of the production process. Chipped stone outliers indicate large cores that have not been exhausted. The presence of moderately reduced cores suggested on-site tool production (Faragó 2019), which was hypothesized for segments 1, 2, and 5, where knapping activity can be detected in the deposition practices. Polished stone tools were made locally, as evidenced by preforms (Fig. 8: 13) and the fact that the majority of these finds are small fragments (median weight 44.0 g). Outliers, however, testify that larger, damaged tools were also deposited in some cases. The presence of the latter in segments 1, 2, 4, and 5 corresponds to the presence of chipped and unworked stone outliers, implying intensive lithic production and curation in these zones. In segments 1-2, we presume a more traditional industry, and in segment 5, we consider a more innovative industry.

The wells are outstanding objects from the settlement structure, therefore their finds deserve special attention. The material recovered from the two centrally located wells adds to our understanding of the depositional practices in Bükkkábrány. In these features, a significant number of finds (total weight 53.0 kg and 168.0 kg) were discovered. The find quantity and stratigraphy indicate intentional deposition; additionally, object fragmentation data indicate deliberate practice in addition to active waste management. Unfortunately, we lack detailed information (which object came from what depth, for example), but the section drawings show an abundance of extremely large daub fragments in the upper 2.5 m of the fill in both wells. A significant amount of quern stones accumulated in the wells, 10 and 32 fragments weighing 13.2 and 34.8 kg, respectively. Aside from the quern stones and daub, above-average sizes were found among the animal bones in well no. 363, as well as among the chipped and polished stones in feature no. 366. Objects of this size

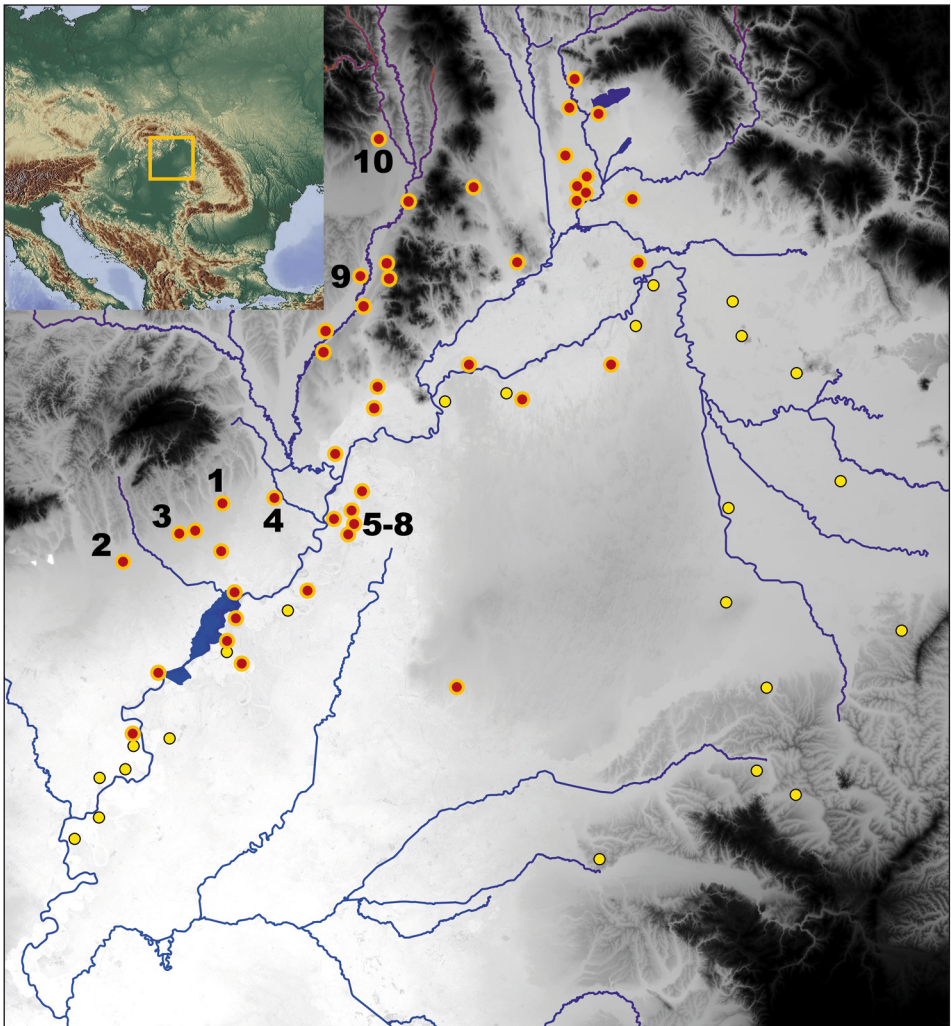
were found infrequently, but in both cases, ceramics, which make up a significant portion of the finds, were much less fragmented than average, even though they did not qualify as outliers. In the absence of a thorough examination, the ceramic assemblage discovered shortly after disuse cannot be linked to a community feast or interpreted as a set belonging to one or more households. Although there are only a few Neolithic wells in North-Eastern Hungary, the intention to create a structured deposit can be seen in several cases (Hajdú 2007; Sebók *et al.* 2013; Füzesi 2016). The details of these Middle Neolithic initiatives, which took place in a single micro-region, complement each other to form a rite with simple choreography.

There was no evidence for such rites in Bükkábrány, but based on the deposition pattern of the wells excavated there, we can conclude that the possibility of a later phenomenon exists in this case. The practice of the increasingly intense heat effect, as well as the cleaning and disposal of the house remains, can be identified as the very early antecedents of the complex rite of deliberate house burning. Similarly, we can consider the large number and variety of finds placed in wells as a precursor to later structured deposits. Late Neolithic ritual practices can be traced back to the very beginning of the developmental series, to the peculiarities identified in Bükkábrány.

#### 4. EARLY ALPC COMMUNITIES AT THE FOOTHILLS OF THE NORTH HUNGARIAN MOUNTAINS

As early as the beginning of the 20<sup>th</sup> century, Ferenc Tompa had outlined the cultural milieu of the *Linearbandkeramik*, whose basic internal chronological and regional groups were identified later, in the 1970s (Tompa 1929; Kalicz and Makkay 1977). Only then did research become significant on the early ALPC, the first agricultural communities to settle in the northern Great Hungarian Plain (Raczky 1983; Nagy 1998). Intensive fieldwork during the 1990s revealed a coherent settlement network in the region (Fig. 14). The sites that have been identified thus far can be divided into two groups based on their habitat preferences: lowland floodplain environments and higher-lying foothills and river valleys. Communities along the Tisza River encountered an environment similar to the southern habitats of the Körös culture. As a continuation of the Bodrogeköz and Rétköz, the Eastern Slovak Lowland had a slightly different but still water-rich environment. On the other hand, some communities have gone far beyond the Körös-culture comfort zone (Kosse 1979). Early ALPC sites in the piedmont zone of the North Hungarian Mountains, and even further upland along larger streams, attest to their adaptation to the local conditions.

More early ALPC sites at the foothills of the North Hungarian Mountains have been discovered in the last three decades: Füzesabony-Gubakút (Domboróczki 1999), Mezőkövesd-Mocsolyás (Kalicz and Koós 1997), Bükkábrány-Bánya VII (Kalli and Tutkovics 2016), and Hejópapi-Szemétlerakó (Domboróczki *et al.* 2017). These sites enriched our understanding



**Fig. 14.** The early ALPC settlement network in Northeast Hungary (based on Kozłowski 1997; Nagy 1998; Kovács 2007; Csengeri 2018) – yellow dots: Körös sites, red dots: early ALPC sites, 1. Bükkábrány-Bánya VII, 2. Füzesabony-Gubakút, 3. Mezőkövesd-Mocsolyás, 4. Hejőpapi-Szeméterakó, 5-8. sites in Polgár microregion, 9. Novajdrány, 10. Košice-Červený rak

of the Middle Neolithic period not only due to their specific geographical location. Large-scale excavations there revealed contiguous settlement sections that fundamentally changed our perception of early Linear Pottery communities (Domboróczki 2009; Domboróczki *et al.* 2017). Füzesabony, Mezőkövesd, Hejőpapi, and the previously studied Bük-



kábrány early ALPC settlements formed a single settlement network in the foothill area of the North Hungarian Mountains, 15 km apart. Except for Mezőkövesd, which we will return to, the internal structures of these settlements are remarkably similar.

The unfortunate lack of comparable large-scale excavations in other micro-regions makes reconstruction of contiguous and complete settlement structures difficult. The Eötvös Loránd University conducted field research on a similar scale in the Polgár microregion. Early ALPC settlements excavated at Polgár-Ferencihát Site 31 (Raczky and Anders 2018, Fig. 1), Polgár-Király-érpart Site 1 (Nagy 1998; Raczky and Anders 2012, 274), and Polgár-Piócási-dűlő (Nagy *et al.* 2014) has demonstrated sparsely scattered settlement structures. The same situation occurred on the approximately 1.5 ha Tiszalúc-Sarkad site (Oravecz 1997, 93, Fig. 1). Piroaska Csengeri's regional research investigated the early ALPC settlement network, of which Novajdrány is one of the most promising locations in the Hernád Valley (Csengeri 2018). As a result, for the time being, the similarity of settlements in the piedmont zone can be interpreted as a regional phenomenon. However, the most recent discovery in the Hernád Valley settlement group was Novajdrány-Szőlőalja II (Zsigai-Csoltkó 2021), another early ALPC settlement with a linear structure.

László Domboróczki proposed the *Füzesabony-Gubakút Settlement Development Model* (hereinafter FGSDM) at the foothills of the North Hungarian Mountains based on his research in the Füzesabony area, supplemented with the results of complementary excavations. Despite its initial shortcomings, the model fits well into the LBK settlement network and settlement structure transformations (Domboróczki 2009; Domboróczki *et al.* 2017). László Domboróczki excavated traces of characteristic (5-6 m wide, 12-16 m long) timber-framed buildings at the Füzesabony site and reconstructed a special settlement structure based on long pits, burials, and other features (Domboróczki 2009). His results solved the scientific debate over pithouses versus pile-dwellings. In the early 1990s, Nándor Kalicz and Judit Koós conducted a rescue excavation at another iconic site, Mezőkövesd, about 15 kilometers to the east, where they discovered debris from burned houses. Long pits, graves, a well, and other features were found in the vicinity of the closely spaced buildings (Kalicz and Koós 2014). The surveyed section at Mezőkövesd appeared to represent a different type of settlement. The remains of burned houses were linked to Körös culture settlements in the Middle Tisza region (Szajol-Felsőföld, Szolnok-Szanda, Raczky 2012). Excavations were conducted at the Hejőpapi site between 2008 and 2010, over nearly 4 ha and covering approximately 90% of an early ALPC settlement, the largest and most complete known to date. Even though only the alignment of a few postholes and long pits per building indicated the houses, which were arranged in two rows, the site added a lot of detail to the previous picture. Burials were located in front of the buildings, while a 40-meter-wide, 200-meter-long empty area, presumably a communal space, unfolded between the two rows of houses. On top of that, a well was discovered in the center of that area (Domboróczki *et al.* 2017, 9, fig. 5).

## 5. LINEAR POTTERY SETTLEMENTS AND THEIR FOCI

Longhouses are still the defining elements of Neolithic intrasite analyses. Houses and their associated features served as structural units (*Hofplatz*: Boelicke 1982, *Household*: Wilk and Rathje 1982), from which the research sought to decipher Neolithic settlement structures and everyday life within. The courtyard model (*Hofplatzmodell*: Boelicke *et al.* 1988) and the row settlement model (*Zeilensiedlungmodell*: Rück 2012) were also focused on these aims and units. While archaeologists sought to resolve the contradictions of these models a decade ago (Lenneis 2012; Link 2012; Zimmermann 2012), recent research has gone beyond this discussion by incorporating three principles: complex and interdisciplinary research, contextualized interpretation, and examination of higher-level organizational principles (see Wunderlich *et al.* 2020). The case studies that were thoroughly examined confirmed the significance of regional differences and the need for adaptable models to account for them (Oross *et al.* 2016, 140). Several structural elements gained prominence, such as the role of empty spaces (Rück 2009, 163, 164, Fig. 5), which had not been considered by either the courtyard or house-row models. Although the pit-house concept has been established in Hungarian research for much longer than in international research (Makkay 1982; Domboróczki 1997), recent large-scale excavations and studies in Hungary have been able to be integrated into current settlement archaeology (Domboróczki 2009; Jakucs *et al.* 2018). These case studies not only added to the regional diversity but also broadened the scope of the analysis. With these in mind, we can appreciate and interpret the Bükkábrány settlement structure and assemblage.

The details of these sites have changed our understanding of early ALPC row settlements in northeastern Hungary (Domboróczki *et al.* 2017). The available data suggest that settlement structures have more complex arrangements than axial symmetry. Two double rows of houses were arranged in axial symmetry at the Füzesabony site, while the fifth row of houses, identified by László Domboróczki through the surface collection, was perpendicular to the previous ones and stood alone on the other, northeastern bank of the brook (Domboróczki *et al.* 2017, fig. 3). In Hejőpapi, the postholes of the northeastern row of houses were arranged towards the outer, not the inner side, and the long pits of the third row of houses can also be seen on the site map (Domboróczki *et al.* 2017, fig. 5).

The serial arrangement in axial symmetry is a dominant feature of these early settlements, but it is not the only one. Unlike the examples of the Western and Central European LBK, each of the cases mentioned is a settlement with non-overlapping structures and a centrally located, extremely large empty area. That 40-50-meter-wide zone usually runs between two rows of houses. The Füzesabony and Mezőkövesd sites were excavated using a unique hybrid method: the affected area was surveyed with sondages, and the excavation expanded from these trenches until archaeological features were reached and included in the work area (Domboróczki 1999, fig. 1; Kalicz and Koós 2014, pl. 2). As a result, previous interpretations of settlement phenomena exclusively identified courtyards and

rows of houses known from German models as defining settlement phenomena. In contrast, full-surface topsoil removal in Hejőpapi and Bükkábrány revealed an empty central area, 40-50 meters wide on average, with wells along its axis. Following these results, a closer examination of other early ALPC settlements in Northeast Hungary reveals structural similarities, such as an empty zone in Füzesabony (Domboróczki 1999, fig. 1) and a well in front of the row of houses and graves in Mezőkövesd (Kalicz and Koós 2014, pl. 2). A well was discovered further away from the row of houses indicated by long pits and associated graves at the Polgár-Piócási-dűlő site (Nagy *et al.* 2014, fig. 4), though the distance is significantly greater than the 40-50 m observed in piedmont zone settlements. After outlining parts of these settlement plans and comparing them to the Hejőpapi and Bükkábrány cases, another common feature emerged: the settlement axes are oriented NNE-SSW. This corresponds to the local relief, implying that, in addition to water proximity, this factor played a role in site selection.

The axially symmetrical house-row settlements are currently unknown in other parts of the LBK area, but they are common in the piedmont zone of the North Hungarian Mountains. Because of the complex, time-averaged Western European settlement remains, the treatment of households (LBK Hofplatz) as basic structural units of analysis was required. These relatively well-defined units were then used in the construction of larger structures in various, often contradictory ways (see Rück 2012), but those attempts never resulted in a coherent model free of residuals. In contrast to the LBK settlements, which are rich in stratigraphic relations, superposition is uncommon in the early ALPC sites. László Domboróczki's detailed absolute chronological studies, on the other hand, confirmed that the formation of these "clean rows" occurred over several generations (Domboróczki 2009, fig. 11). The interpretation of the settlement's macrostructures is aided by the fact that construction activity followed a consistent organizing principle over time (compare with the issue of the pseudo-ditch system: Lefranc *et al.* 2017). Previously, such intentionally planned spatial organization was assumed primarily in monumental architecture: tells, enclosures, and mega sites (Chapman 2012; Raczky 2015; Pásztor *et al.* 2015). However, Hillier's theory of space syntax (Hillier 2007) now allows for an exact discussion of the topic in archaeological research, even in locations where the spatial organization is not visible to the "naked eye" (Cutting 2003).

## 6. THE NEOLITHIC HOUSEHOLD: STRUCTURE AND FRAMEWORK OF ACTIVITIES

In his first interpretation of the "Hofplatz", Boelicke linked the structures emerging from archaeological features and the processes reconstructed based on the finds (Boelicke 1982). Simultaneously, Wilk and Rathje published the volume that has come to define household research to this point (Wilk and Rathje 1982). They discovered three governing

aspects of households that have interdependent functions: social, material, and behavioral. The role of the human agent came to the fore in the interpretation of household activities such as production, distribution, transmission, reproduction, and co-residence as a result of the influence of post-processual archaeology. However, the difficulties of archaeological research stemmed from the fact that, while the household is a well-understood phenomenon in ethnography, it is a plastic (*i.e.*, sufficiently flexible) social unit located somewhere between the individual and the entire community in archaeology. That is, to be a useful *terminus technicus*, we must cultivate contextual archaeology. The difference in temporality between household operation and site formation on the one hand, and the time-averaged vestiges we recognize on the other, demonstrates the practical difficulties of studying this topic. While establishment and operation are primarily a series of individual actions that result in short-term events, only medium and long-term scales allow for observation (for details, see Allison 1999; Wesson 2008; Hachem and Hamon 2014).

As a determining factor, time was also included in the *FGSDM*. The Füzesabony settlement lasted 340 years, from 5560 to 5220 BC, with the settlement structure developing gradually over five shorter phases (Domboróczki 2009, fig. 7). Each row of houses grew at a different rate over 2-3 centuries. Although they did not expand in a straight line, we agree that their organizing principle was already in place when the settlement was established. The spatial and temporal dynamics at Füzesabony represented the pattern seen in Schwanfeld, which inspired Harald Stäuble to develop the Vater/Großvaterprinzip model (Stäuble 2005). Contemporaneity and succession, as well as temporal dynamics in general, have played important roles in both courtyard and house-row settlement models (Rück 2012; Zimmermann 2012). A realistic estimate of the buildings' lifespan was especially important to Oliver Rück. Instead of the previously accepted 25 years, he proposed 100 years, during which the buildings would serve as connecting points between human generations (Rück 2012). Beyond the elusive short-term patterns, the medium-term patterns thus transformed into a plastic, entangled system. The traditional method for identifying contemporaneity – refitting – does not provide exact results in this new, dynamic framework, but it does shed light on contexts to be considered. In Füzesabony, ceramic refitting resulted in connections spanning 2-3 buildings (30-50 m) within each row of houses (Domboróczki 2009, fig. 5). According to the published data, the affected 2-3 buildings can be interpreted as contemporary households or as buildings established in the same courtyard of a household but at different times.

Because ALPC settlement finds (like LBK) are usually found in a secondary position, we must also consider the phenomenon of deposition and related activities that were encoded into the archaeological material when interpreting them. The significance of deposition in community life was to strengthen the relationship between individuals, objects, and locations (Chapman 2000). Waste management had been the typical context of deposition, which produced a significant proportion of archaeological finds. Structured depositions, created through symbolic acts, opened up a new segment for material culture communication.

However, in some contexts, these two practices became inseparable, as subsistence activities merged with ritual acts (Raczky *et al.* 2018). The primary deposition places, pit complexes, show evidence of both practices, providing exceptional find material in terms of both quantity and quality. Only detailed contextual observation allows for a thorough interpretation of this material and exploration of the various levels in the practice of deposition.

The practice of deposition strengthened patterns of behavior required for the community's survival and success. These practices were influenced by the sedentary, food-producing lifestyle as well as the local environmental characteristics. The individual or community chose the most appropriate activity for themselves from the pool of activities responding to these opportunities and needs. Nonetheless, their decisions were heavily influenced by socialization (learning-teaching), *i.e.* culture. Bourdieu's concepts of *habitus* and *field* adequately describe the relationships (Bourdieu 2020) that an archaeological study of a household undertakes to explore.

However, due to a large number of unknown variables in the analysis, the evaluation of material patterning in archaeology should not be equated with the reconstruction of households. Material culture must be read differently (Allison 1999). When evaluating the finds, we can consider the web of functions and activities in which they were involved. Functional identification of finished artifacts or recognizable tools such as ceramic vessels, bone awls, stone axes, or clay weights is not difficult. By including the deposited objects in the operational chain of related activities, the interpretation of the deposition can be aided. Each object type is located at a different node in the operation sequence (raw material procurement, production, use, and abandonment) (Tixier 2012). The ochre was buried as raw material, the chipped stones as byproducts, the stone and bone implements as finished tools, the broken pottery as waste, and the animal bones as garbage. The spatial patterning of different object types at the sites frequently suggests differences in the functioning of individual households (intrasite groups), illuminating structural phenomena that would otherwise be difficult to observe.

## 7. ACTIVITY GROUPS IN THE EARLY ALPC COMMUNITIES

The early ALPC site in Bükkábrány has been analyzed based on limited information so far. The determining elements of the obvious and regular settlement structure (rows of houses, a central space between them, centrally located wells) and partially identifiable features (buildings) that became known over a large area were used in the examination of its spatial structure. In doing so, we set up nine spatial segments with an interpretive role in the subsequent analysis (Fig. 10). We determined the temporal frames: the 250-280 years between 5470-5210 BC is the period during which the settlement structure developed and the community that created it was been operating. For the time being, the internal

dynamics of this process are lacking in detail. However, the available  $^{14}\text{C}$  data show that segment 2 was actively used for almost the entire duration of the settlement (Tab. 1, Fig. 2).

We examined the community's activities using three data sets derived from the found material. The frequency and weight data of ten important Neolithic find types, as well as other objects, were analyzed using a key spatial statistical method (Kernel density estimation) and univariate statistics (boxplot chart). The patterns investigated were consistent with the previously defined spatial segments (Fig. 11-13). Taken together, these patterns revealed that the high or low values of specific find types indicate qualitative differences in the activities performed in each segment. Aside from divergent activities, fragmentation data and the presence of outliers in each find group (Fig. 10) indicate differences in the practice of deposition between individual segments. The analyses of findings support the use of these spatial segments in community and settlement research.

However, when interpreting our findings, we must keep in mind that, while each intra-site social group carried out their activities in the short term at an undetermined frequency, the deposited finds provide a long-term pattern merging past activities. As a result, we cannot equate a spatial segment, the patterning of the objects within it, the practices assumed as a result of this pattern, and any previous social unit. To express this relationship, we must use other mathematical symbol combinations ( $<$ ,  $\leq$ ,  $\approx$ ,  $>$ ,  $\geq$ ) rather than the equals sign. According to  $^{14}\text{C}$  data from segment 2, the 3-5 adjacent buildings per segment can be assessed as features built consecutively for one household. However, it has now been demonstrated that the "one household = one house" formula is not always true (Mesterházy *et al.* 2019, 17-21; Raczky *et al.* 2018, 121-123; Raczky *et al.* 2020), implying that the adjacent buildings could be contemporaneous. Concurrent activity areas at the Füzesabony site are comparable in size to the Bükkábrány segments, according to refitting studies (Domboróczki 2009, Fig. 5). However, it is uncertain whether the groups of actors represent individual settlement households, or whether they should be regarded as activity groups in which members of different households collaborated.

We consider our results a starting point for further research. The spatial segments delimited by the elements and regularities of the settlement are regarded as analytical units located in scale between the individual features and the settlement as a whole. Their utility has been demonstrated by distribution pattern analyses of various materials. However, these units may prove rigid in subsequent, more detailed analysis. The different patterning of the spatial segments can be explained in a variety of ways: 1) The courtyard model was based on a close, long-term relationship between the spatial unit and its archaeological phenomena; 2) A looser relationship allows the activities of different generations to be linked into a fictitious spatial unit. In other words, as explained by the house-row model, traces of short- and medium-term phenomena accumulated into a long-term settlement structure; 3) By emphasizing spatiality, we direct interpretation toward activity zones; Or 4) by focusing on the activity and the actors, we orient interpretation toward activity groups. These approaches are not mutually exclusive; in fact, they can be used in conjunction

when evaluating patterns in archaeological data. Case studies can be used to properly discuss the relationships between households and other social units, archaeological phenomena, and artifacts (e.g., Marton 2013; Müller *et al.* 2013; Stadler and Kotova 2013). Case studies support the diversity of research and interpretation options, as well as the complexities and nuances of the issue of prehistoric “households” and communities.

This study was implemented with the support provided by the National Research, Development and Innovation Fund of Hungary, financed under funding scheme “PD”, Project no. 129323, “Interaction between landscapes and communities in the Neolithic: modeling socioecological changes in Northeast-Hungary between 6000-4500 BC.”

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