

# Varbola: on the function of an 11th to 14th-century stronghold in northwestern Estonia based on location analysis and written sources

Kristo Siig   
kristosg@tlu.ee

School of Humanities, Tallinn University,  
Narva mnt 25, 10120 Tallinn, Estonia

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## ABSTRACT

The Varbola hillfort is one of the largest prehistoric fortifications in the eastern Baltic. Although it stands out as a major political centre in literary sources from the 13th century, and the archaeological record points to a proto-town with almost a hundred households, its location has puzzled scholars for nearly a century. While Varbola has been claimed to be situated in a peripheral area not suited for the emergence of a power centre, this notion of ‘peripherality’ has not been examined in a measurable way to allow for comparison with other strongholds. The article explores this issue by employing a GIS-based methodology inspired by site catchment analysis and quantifying the amount of fertile soils, known archaeological settlement sites, burial places and early modern manors around Late Iron Age forts in northwestern Estonia within four different radii. Results demonstrate that Varbola is actually ‘average’ in terms of centrality, rather than ‘peripheral’. As Varbola is located at the edge of the area covered by the large Estonian list of the Liber Censu Daniae, an important 13th-century source for settlement history, it can be argued that perceptions of Varbola’s peripherality are influenced by the ‘edge effect’. Analysis of historical sources suggests that Varbola is more likely to have been a power centre than a trading hub, and its emergence might be related to the Lode magnate family.

## KEYWORDS

hillfort, Iron Age, site catchment analysis, spatial analysis, GIS.

## Introduction

The Varbola hillfort, located in northwestern Estonia, stands out as one of the largest prehistoric strongholds in the eastern Baltic area, featuring a 20 000 m<sup>2</sup> courtyard and up to 10 m high drystone walls (Tamlä 1992; Tõnisson 1999).

The site has been studied in several excavations in the 20th century, first by Eerik Laid in the 1930s, and later by Evald Tõnisson and Ülle Tamla in the 1970s and 1980s (see Tõnisson & Tamla 2008). The excavations revealed a 0.5–0.9 m thick cultural layer, containing pottery, tools, household implements, ornaments and a few weapons (Tamla 1992). The results show that the fort was used from the 11th to the 14th century, with the most intensive period of occupation falling into the 13th century. The courtyard is dotted with piles of stones, marking ancient stoves and indicating that there might have been around 90 households or up to 1000 people (more likely 500) living in the stronghold (Tõnisson 1999; Lang 2004). Varbola is also mentioned in early historical sources, such as the Chronicle of Henry of Livonia (HCL) and the East Slavonic chronicles (e.g. First Novgorod Chronicle, FNC). Based on these sources, Varbola and its inhabitants (*Warbolenses*) play an important, even maverick role in the 13th century crusades (see more in Discussion below).

The predominant view in Estonian archaeology has been, for the past few decades, to consider Late Iron Age (ca 800–1225) fortified sites as power centres of local nobility, fulfilling economic and administrative functions for their surrounding fort districts (Ligi 1995, 231–232; Lang 2000, 279–285; 2002; 2012b; Tvauri 2002; Mandel 2004; 2006; Tvauri 2012, 318–320; Oad 2014; Siig 2014; Valk 2014; 2020a; for a different interpretation, see Mägi 2013; 2020). Nevertheless, many scholars have been reluctant to see Varbola as a typical stronghold or seat of power, arguing that the site is located in a peripheral area with a sparsely populated hinterland hardly capable of supporting a huge fort and its garrison (Laid 1938; Mägi 2020). Because of this, Varbola has remained an unexplained outlier among Final Iron Age (ca 1050–1225) hillforts.

However, these claims originate from general works that do not focus solely on Varbola's location. Furthermore, these assertions have not been backed up by formal analysis that would allow comparison of locational aspects with other contemporaneous forts. The current study aims to fill this vacuum by using a quantitative methodology and specifically targeting the question of Varbola's peripherality, thereby providing new insights into the discussions about strongholds and social structures behind them in 11th to 13th-century Estonia.

## History of research

The locational aspects of forts and their relationship to sociopolitical structures were first discussed in Estonian archaeology in the 1920s and 1930s. Eerik Laid, who led the initial excavations in Varbola, made the first attempt to place the site in a larger context (Laid 1938). By analysing maps and the contemporary cultural landscape around Varbola, he claimed that Varbola was located in a peripheral area where agricultural fields formed small pockets between large forests and bogs.

This idea of a peripheral location has been repeated in consequent works. For example, Lang (2002; 2012b), while arguing strongly in favour of hillforts being centres of political power, points to Varbola's peripheral location towards agricultural settlement as indication that it does not fit the power centre model. Markus (2007) suggests that if Varbola is located in a border zone, it might be a trading centre. Mägi (2020) classifies Varbola as part of a group of Late Iron Age hillforts 'situated near wetland areas with only some restricted clusters of arable lands in the vicinity'. She argues these might have been trading nodes where merchants switched modes of transportation, namely coming from the sea in the navigation season and then waiting for a couple of months to continue by land using winter routes across frozen rivers, lakes and wetlands.

These attempts at interpreting Varbola are connected to a wider discussion about the function and role of strongholds in Iron Age social structures. As in many other countries with Bronze Age or Iron Age fortified sites, scholars in Estonia have also suggested different interpretation models. In the 19th century and most of the 20th century, forts were mainly seen as refuge forts erected by small-scale and egalitarian farming societies (Hueck 1840, 48; Jung 1898, 225; Moora 1926, 86; Tõnisson 1982, 323–324; cf. central European *Fluchtburg*, e.g. Brather 2006; Harkel 2013), but some scholars have kept to this model even quite recently (Tamla 1992; Mäesalu 1993; Tamla 1993). In the past few decades, the power centre or *Herrensitz* (cf. Brather 2006) model has come to dominate (e.g. Tvauri 2002; Lang 2012b; Valk 2020a; for more see in Introduction above). It implies that strongholds were built and permanently inhabited by elites extracting taxes or dues from the surrounding areas. According to Tvauri (2002, 293), hillforts with a thick cultural layer and located centrally towards settlement indicate permanent inhabitation and being a power centre, while forts located in peripheral areas and exhibiting no cultural layer could be classified as refuge forts. However, according to this logic, Varbola and some other sites (e.g. Soontagana) located far from major settlement centres, but exhibiting a significant cultural layer, do not fit into either category. At the same time, Mägi (2018, 121–126, 255–264, 280–285, 367–369; 2020) has shown how many Viking Age and Final Iron Age hillforts are located near possible or known harbours and could be interpreted as guarding marketplaces or trade centres. She also argues that a cultural layer is not necessarily indicative of permanent settlement, but could have also formed under long-term seasonal use (Mägi 2013).

It is possible, however, that hillforts as a heritage management or morphological category actually encompasses sites with different functions (Ibsen et al. 2022; cf. Valk 2020a, 108; Mägi 2020, 50–51). Perhaps the functions should not be understood as very clear-cut either – economic and political power embodied by the elite often attracted crafts and trade, marketplaces attracted those who wished to dominate or tax trade. Instead of searching for a universal interpretation for the entire category, it would perhaps be more fruitful to examine each site and

the relevant evidence individually to determine its primary function, whether its development was rooted in controlling a territory of agricultural areas or strategically positioned to command trade routes. Such an approach has been used by the author in discussing forts in the region of Virumaa (Siig 2022) and will be applied to Varbola below.

## Theoretical and methodological considerations

At the heart of the discussion about the function of forts are ideas concerning the spatial distribution of settlements in relation to one another and to natural environmental factors. The theoretical underpinnings of these discussions have usually not been explicitly stated but echo the basic principles of economic geography and location theory. For example, the assumption that power centres are situated in the middle (not at the edge) of a settlement cluster can be linked to the idea of minimising movement costs as a fundamental factor affecting the location (see Clarke 1977 for references to connected works in economic geography). Another basic argument from historiography is that larger centres required larger hinterlands (for applications of this principle in spatial modelling, see Renfrew & Level 1979; Ducke & Kroefges 2008). As the previously discussed studies about the location of forts deal with clearly quantifiable economic and environmental factors, they provide excellent grounds for employing a quantitative spatial analysis methodology.

Although previous studies have claimed that Varbola is situated in a peripheral location, none have made the process of arriving at these results explicit and reproducible. The claims about landscape and locational aspects seem to be 'impressionistic', based on visual inspection of modern topographic maps or find distributions.

There are two reasons to be cautious with such claims. Firstly, simply stating that there is little arable land around Varbola is not very helpful without a quantifiable comparison with other strongholds. A reference group is necessary to determine whether the site in question is significantly less or more peripheral than other sites. However, such a comparison requires a uniform methodological approach.

Secondly, it is unclear which spatial scale these claims apply to. Are we considering the availability of arable land only in the nearest vicinity, perhaps 1–2 km around the fort, to determine whether it could be a self-sustainable agricultural unit? Or are we examining a larger hinterland, maybe the density of settlements within a 10 or 20 km radius that could provide sustenance to the centre through tribute or taxes? Measures of centrality may vary across different scales: there might be plenty of arable land in the immediate vicinity of the stronghold, forming a compact settlement area, yet it might be surrounded by vast forests and wetlands. It can also be the other way around – a stronghold 'hidden' in a forested area but surrounded by large settlement areas on a broader scale (cf.

Bevan 2020, 65–66 for clustering at different scales in spatial point pattern analysis).

Hence, to discuss the role of Varbola in the social structures of its time, this peripherality (or its opposite – centrality) should be analysed in a formal, explicit and reproducible way, allowing for comparisons with other similar sites and at multiple scales.

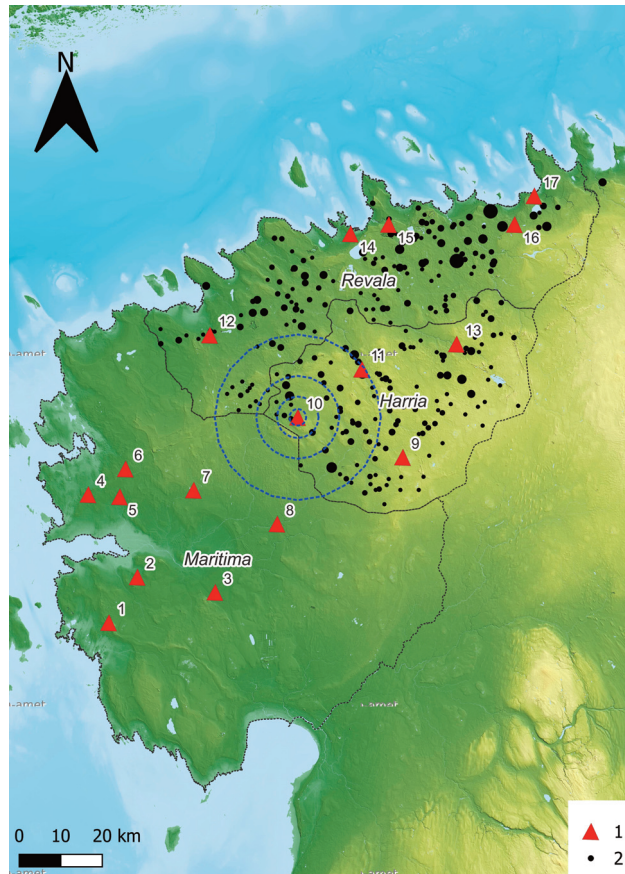
Centrality in premodern settlement patterns can, of course, be conceptualised in different ways. Sites might be centrally positioned towards regional or international trade routes, material resources or both. The current study focuses solely on testing the claims about peripherality made in previous historiography, which concerns centrality towards settlement areas or arable land. In these circumstances, the power of a central place is expected to correlate with the population of the hinterland, whose agricultural output can be taxed. Given that the exact population distribution of Final Iron Age Estonia is unknown, proxies will be used (see in Data below). A useful method for comparing the centrality of different locations is to sum up all taxable resources within a specific catchment or radius of each centre. In essence, this is site catchment analysis that has been used since the 1970s to assess site function based on the resources available within a site's catchment (Higgs & Vita-Finzi 1972).

Given the uncertainty about the spatial extent of a fort's hinterland, i.e. the size of the area where taxes were collected (see more in Discussion below), this study evaluates centrality at varying radii or geographical scales. It utilises catchment radii spanning 2, 5, 10 and 20 km (Fig. 1). Anthropological research indicates that catchment radii of agricultural communities are typically up to 5 km or an hour's walking distance, although in many contexts, a 2 km radius is sufficient (see Bintliff 1994). It is anticipated that the most basic central locations would cater to communities within a 10 to 15 km radius (*ibid.*). Nonetheless, there is a possibility that multi-level political structures existed in Final Iron Age Estonia, encompassing larger areas (for further details, see Oad 2012; 2023; Valk 2020a).

The centrality values will be calculated using spatial queries and libraries for geospatial analyses (*sf*, *REACT*, *exactextractr*) in R. A similar analysis has been conducted on hillforts in Virumaa (Siig 2022). As there are several possible proxies or indexes for taxation potential (see in Data below), calculations will be made for all proxies separately and for all forts in the dataset. For each proxy, the results will be normalised into the range of 0 to 1<sup>1</sup>, and all forts will be given a rank in the index, enabling comparability across indexes.

In studying settlement history, the disadvantage of site catchment analysis is its lack of temporal perspective – it offers only a snapshot in time. Settlement

1 Normalisation entailed subtracting the minimum value at that scale, then dividing by the range at a specific scale from the value of a fort at that scale (the difference between the maximum and minimum values), so that all values fall between 0 and 1 for easier comparison.



**FIG. 1.** Historical provinces comprising the research area. 1 – strongholds, 2 – villages recorded in the Liber Censu Daniae (the size of the symbol represents the number of ploughlands). Dotted lines around 10 (Varbola) denote catchment radii (2, 5, 10, 20 km), with the largest circle marking the 20 km radius catchment. Strongholds: 1 – Vatla maalinn, 2 – Lihula, 3 – Soontagana, 4 – Ridalu Tubrilinn, 5 – Ehmja Kuradimägi, 6 – Leedi Hallimägi, 7 – Kullamaa Rohumägi, 8 – Konuvere, 9 – Keava linnamägi, 10 – Varbola Jaanilinn, 11 – Lohu Jaanilinn and Lohu II, 12 – Padise Vanalinnamägi, 13 – Ahisilla, 14 – Tallinna Toompea, 15 – Iru Linnapära, 16 – Kuusalu Pajulinn, 17 – Muuksi linnamägi. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

patterns, however, evolved over time and did not appear ‘out of nowhere’. For example, it has been argued that agricultural settlement in Estonia started in coastal areas and gradually expanded inland through internal colonisation (see e.g. Lang 1996; 2000, 285–287 for northern Estonia; Mandel 2003, 163–174 for western Estonia). Corresponding to this model, the settlement around Varbola, located inland, is thought to have developed later than in other areas of Harjumaa (Lang 2002, 150–151; see also 2012b, 217). The lack of temporal perspective could be mitigated by running the analysis many times with different datasets (e.g. settlements in periods A, B and C). However, as shown below, it is difficult

to adequately model the distribution of settlements in a narrower time frame than the Iron Age. Therefore, this aspect should be borne in mind when discussing the results.

The methodology used here falls into the broader category of quantitative site location analysis (see Verhagen 2018), which has also been applied to Estonian Stone Age and Iron Age sites (Sikk et al. 2020; Haav 2014). While spatial studies often analyse a category of sites against environmental factors or compare different temporal sets of sites, this study examines the proximity of individual sites to multiple proxies for settlement. It then compares each site to a reference group of peers to identify anomalies or normalcies, much like a medical analysis would compare an individual's health metrics to statistically determined reference values. Thus, the approach chosen here is not a push-button solution (cf. Gillings et al. 2020, 12) but an ad hoc combination of methods aimed at addressing a specific research problem and inspired by common practices in quantitative spatial analysis. For example, while random sampling of the research area is often used as a background population or control group (Kvamme 2020), in this study, a single site is compared to a distribution of other sites. It must be noted that the study does not aim for a comprehensive analysis of all aspects of locational choices but seeks to test specific claims from previous studies. The fundamental drive behind this approach is an aspiration for epistemological transparency to make the assumptions explicit and the procedures reproducible, making a quantitative approach highly fitting (see VanPool & Leonard 2011, 2).

However, the quantitative analysis in this study addresses only the narrow question of Varbola's centrality or peripherality in comparison to peer sites. The results of this analysis are subsequently used as a basis for an extensive discussion, using mostly written sources to interpret and complement the data, so as to arrive at a fuller understanding of Varbola's position in the social and political setting of Final Iron Age Estonia.

## Data

### SITES

For a suitable reference group or background population, 17 forts dating to the 11th to 13th centuries in northwestern Estonia (the ancient districts of Revele, Harria and Maritima/Rotalia, historically Harjumaa and Läänemaa) were included in the primary dataset (Fig. 1; Table 1). The dating of sites was primarily determined by radiocarbon dating samples, but in certain instances, only historical documents, archaeological discoveries, or typological classification were available to establish their age.

While many of these forts were contemporaneous with Varbola, there are four sites (Konuvere, Ahisilla, Iru and Kuusalu) that were abandoned in the 11th century, when settlement in Varbola only started. Sites not contemporaneous with

TABLE 1. Strongholds analysed in the study. Coordinates are in the Estonian Coordinate System of 1997 (EPSG: 3301)

No.	Name	X	Y	Date	Based on	Certainty
1	Vatla maalinn	483804	6495075	7th–13th century	<sup>14</sup> C, finds	Beginning unclear, 13th century confirmed
2	Lihula linnus	490672.1	6506093	7th–13th century	<sup>14</sup> C, written sources	
3	Soonatagana maalinn	509401.9	6502422	8th–13th century	<sup>14</sup> C, finds, written sources	
4	Ridala Tubrilinn	478837.7	6526022	13th century	Finds	Uncertain date
5	Ehmja Kuradimägi	486432.3	6525478	9th–12th century	Finds	Uncertain if fort
6	Leedi Hallimägi	487826.8	6532210	11th–13th century	<sup>14</sup> C	
7	Kullamaa Rohumägi	504231.1	6527086	13th century	Written sources, finds	
8	Konuverre linnamägi	524335.8	6518920	10th–11th century	<sup>14</sup> C, finds	
9	Keava linnamägi	554580.1	6535030	8th–13th century	<sup>14</sup> C, finds	
10	Varbola Jaanilinn	529305.6	6544662	11th–14th century	<sup>14</sup> C, finds, written sources	
11	Lohu Jaanilinn and Lohu II	544740	6556237	10th–13th century	<sup>14</sup> C, finds, written sources	
12	Padise Vanalinnamägi	508119.6	6564514	7th–14th century	<sup>14</sup> C	
13	Ahisilla linnusekoht	567530.5	6562343	9th–11th century	<sup>14</sup> C	Uncertain if fort
14	Tallinna Toompea	542013.5	6588965	13th century	Written sources	
15	Iru Linnapära	551203.6	6591221	6th–11th century	<sup>14</sup> C, finds	
16	Kuusalu Pajulinn	581505.3	6591229	11th century	Finds	
17	Muuksi linnamägi	586242.1	6598122	11th–14th century	<sup>14</sup> C	



Varbola were included for several reasons. Firstly, using a wider reference group increases robustness to outliers. Secondly, even though some changes in the network of strongholds took place in the 11th century and the size of the fortifications increased (see Siig 2014), Viking Age (800–1050) and Final Iron Age (1050–1225) forts are still usually treated in the same framework and no substantial change in locational factors has been argued (cf. Lang 2002; Tvauri 2012; Valk 2020b). Thirdly, while settlement obviously expanded between the 11th and 13th centuries and it is problematic to analyse the location of 11th-century sites using 13th-century data, the core structure of the settlement pattern must have stayed the same, as the analysis presented below showed that the general distribution of Iron Age sites fits 13th-century data better than the more precisely dated dataset of 11th to 13th-century sites.

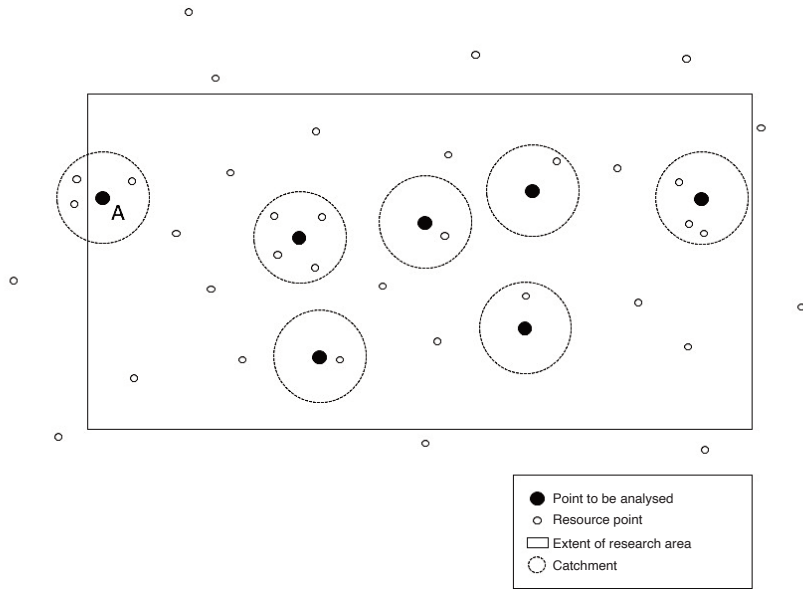
In a landscape analysis such as this one, comparable landscape conditions are an important prerequisite for forming a suitable reference group. The landscape of northwestern Estonia is uniform in many ways: flat, lying on limestone bedrock, and structured by the lower course of numerous small rivers flowing predominantly northwest or west. Forests and fields with thin rendzina soils, cambisols and podzols are interleaved with patches of wetland and gumbo soils (EEa). The only major difference is that the northeastern part of the area (ancient Harria and Revele) is mostly located on the Harju Plateau, 40–60 m a.s.l (EEb), while western Estonia (ancient Maritima) is situated on coastal lowlands (EEc).

#### PROXIES

There is no direct information about population distribution in Final Iron Age Estonia. A near-ideal data source would be the large Estonian list of the Liber Census Daniae (LCD), a 13th-century record of villages and land holdings in northern Estonia (see Johansen 1933 for the source publication). However, Varbola is located at the edge of this dataset (see Fig. 1), meaning that using these data for catchment analysis would be seriously affected by the ‘edge effect’.

In spatial analysis, the term ‘edge effect’ denotes a situation where points close to the edge of the study region get smaller values than those in the centre of the study region simply due to the rejection of areas outside this region (Wheatley & Gillings 2002, 186; Conolly 2020, 126; see Fig. 2). Thus, LCD data must be discarded for the following quantitative analysis and data with larger spatial coverage should be preferred.

In the absence of direct measures, proxies must be used to estimate taxable agricultural output. Several such proxies are introduced in this study. None of these are ideal and each has significant shortcomings, but these deficiencies are acknowledged and critically examined below. Combining different proxies allows for triangulation, offering multiple vantage points and enabling a complex analysis of the locational aspects of forts.



**FIG. 2.** The concept of ‘edge effect’ explained in the context of catchment analysis through a random point pattern in abstract space. Results for point A are affected by the ‘edge effect’.

## Soil

One proxy for taxable agricultural output that is relatively easy to quantify is the distribution of soils suitable for arable land. Previous scholars have stressed the concentration of Iron Age and historical settlements in areas with fertile soils due to the importance of agricultural subsistence in societies of the time (see Lang 2000, 21–23 for a critical overview). Additionally, soil distribution can be modelled easily using high-quality soil maps from the 1960s and 1970s, provided in digitised format by the Estonian Land Board (see Kmoch et al. 2021 for a re-structured dataset).

A shortcoming of using soils as a proxy is that this approach is highly environmentally deterministic (see Gaffney & van Leusen 1995). Not all suitable soils were tilled in any given period, and settlements might have emerged in locations that were sub-optimal for agriculture but favourable in some other, social or cultural aspects that might not be detectable simply from ecological data (Lang 2000, 21–23). Moreover, Iron Age people did not have soil maps at hand to optimally plan their settlements, but they assessed the landscape using some other indicators. Nevertheless, knowledge and data about these indicators are lost to us, and we can only make sound inferences about settlement choices using existing data about objective natural conditions that must have affected the lives of ancient societies.

Another possible issue is that modern soil data, collected in the 20th century, might not exactly correlate with 13th-century conditions, as erosion, amelioration, urbanisation, and industrial activities have all influenced soils in the area. However, a comparison of 17th-century land use maps and modern soil data shows that historical and modern distributions of soils correlate well, suggesting that modern soil maps can be useful in studies of settlement history (Koppel 2005). Another study on Iron Age sites in southeastern Estonia concluded that by the Final Iron Age, the distribution of settlements closely corresponded to areas naturally suitable for settlement (including soils) and the land resources seem to have been maximised (Haav 2014, 50, 69).

To construct a dataset of soils predicting the locations of 13th-century villages, 19 combinations of soil types were examined. These combinations were chosen based on previous studies targeting soil types correlating with Iron Age settlement in Estonia (Haav 2014) and soil map explanatory information describing the most fertile soils from an agronomist perspective (Estonian Land Board 2001). All combinations of soil types were rasterised and focal statistics were used to calculate the amount of fertile land within a 1 km radius of each raster cell for each combination.<sup>2</sup> The resultant layers were used to calculate the correlation between soil types and villages recorded in the LCD.

The combinations were analysed using a two-sample Kolmogorov–Smirnov (KS) test and calculating Vargha and Delaney’s A measure. The KS test assessed whether the distribution of LCD settlements was random towards supposedly good-quality soils (see Wheatley & Gillings 2002, 125–128). For each combination, the analyses were run 100 times (both treatment and control sample size  $n = 200$ ) and the results averaged. The results revealed a statistically significant difference ( $p < 0.001$ , BFB  $< 52.9^3$ ) between the two distributions in 16 out of 19 combinations. Vargha and Delaney’s A measure was calculated to assess the effect size or probability that the sum of raster cells with said soil types within a 1 km radius of an LCD village was larger than that of a randomly generated point in the same area (Vargha & Delaney 2000; cf. Sikk et al. 2020). For the following analysis, the combination of soil types with the largest A measure size ( $A = 0.71$ ) was chosen, which included cambisols, luvisols, regosols and leptosols (see Siig 2024 and Fig. 3). Such a large effect size indicates a high likelihood that a random site pulled from the LCD data has more good quality soil in its surroundings than a random point in the research area (the background population).<sup>4</sup>

2 Most of the data manipulation was conducted in R, except for one operation in ArcMap 10.8.2. See more in Jupyter notebooks in the data package in Siig (2024).

3 This means that the odds of H1 (the LCD settlements were more likely to have the analysed soil type combination within a 1 km radius compared to random points on the map) being true is at most 98.1% (see Benjamin & Berger 2019).

4 The R scripts used and a more thorough reporting of the analyses is provided as Jupyter notebooks in the data package in Siig (2024).



FIG. 3. The distribution of fertile soils in the research area. 1 – strongholds, 2 – fertile soils. For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

## Settlement sites

Environmental determinism could be bypassed by using actual data about archaeological settlements, e.g. the number of known settlement sites around the stronghold. The advantage of this proxy is that we have clear evidence that these sites were used. Nevertheless, there are also limitations. Usually, there are no structures visible above ground in Estonian Iron Age settlement sites to enable the use of typochronology to choose only sites dated to the Final Iron Age. At the same time, only a handful of Iron Age settlement sites have been extensively excavated (e.g. Lehmja-Loo, see Lavi 2005), while the vast majority of known settlement sites considered to date to the Iron Age have only been passingly field surveyed and have yielded a few small potsherds, slag or obscure metal objects that do not allow for precise dating. Therefore, it is difficult to determine whether a site was in use during the period in question. Even if a datable stray find from

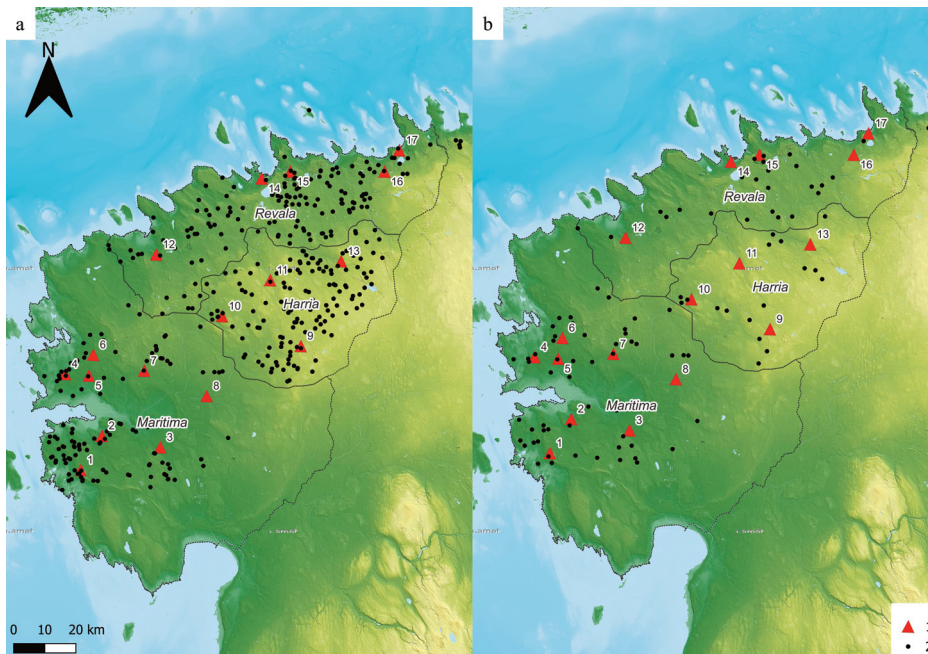


FIG. 4. The distribution of archaeologically known Iron Age settlement sites with finds in the research area (a) and the distribution of settlement sites that can be dated to the 11th–13th centuries (b). 1 – strongholds, 2 – settlement sites. For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

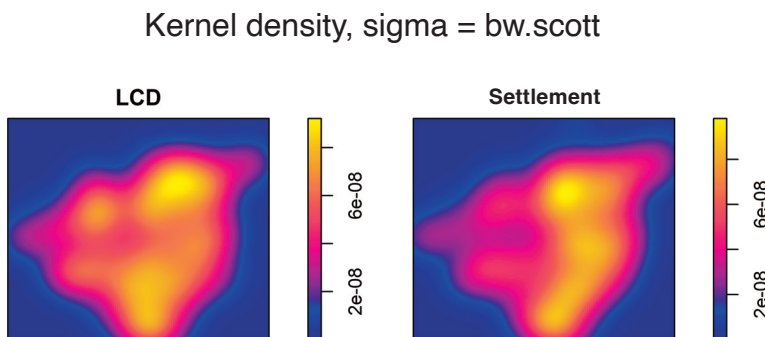


FIG. 5. A kernel density estimation of LCD villages and recorded archaeological settlement sites in Harjumaa. Lighter values indicate denser settlement. North is up.

period A has been found during a survey, it does not rule out that the site was also used in period B before more thorough excavation.

Another thing to consider is recovery bias (see Bevan & Wilson 2013): archaeologically detected settlement sites are only a part of all settlements that existed in a given period, and their absence in some areas does not necessarily mean an absence of settlement but rather limited research or poor preservation of

settlement traces. In the research area, there seems to be a lack of archaeological investigation in western Harjumaa compared to the LCD data, while the eastern part seems to have been more thoroughly surveyed,<sup>5</sup> distorting the distribution (see Figs 4 and 5).

Furthermore, simply mapping the distribution of settlement sites masks the size differences between settlements and their agricultural output. For example, in the LCD, village sizes in northern Estonia vary from 1 to 70 ploughlands (Johansen 1933, 308–676).

Nonetheless, archaeologically known settlement sites can and should be used as one proxy for taxation potential. The dataset of settlement sites used in this study was constructed based on the databases of the Estonian National Heritage Board (National Registry of Cultural Monuments) and the University of Tartu (Archaeological Sites in Estonia). Considering the lack of precise dates from settlement sites and the possibility that using a narrow dataset of sites dated to the 11th to 13th centuries might not be representative, three different datasets were analysed: 1) all Iron Age settlement sites, 2) all Iron Age settlement sites that have yielded finds archived in archaeological collections, and 3) all 11th to 13th-century settlement sites.<sup>6</sup> As multiple nearby patches of cultural layer within the territory of a single historical village have sometimes been registered as separate settlement sites, those located within 500 m of each other were merged into one point.

To test how well the locations of settlement sites correlate with the LCD villages, the following procedure was performed. First, a subset area was chosen in the middle of Harjumaa that was entirely covered by both the LCD and settlement datasets. The point patterns of each of the three datasets were investigated and compared against the LCD point pattern, using the cross-K function (Baddeley & Turner 2005, 19–20), which is suitable for analysing clustering between points of multiple types at multiple scales. All three datasets exhibited significant clustering to the LCD points at smaller scales (up to 2 km).

In an attempt not to burden the paper with too much information, only the results from one dataset were chosen for presentation.<sup>7</sup> Dataset No. 3, which included only 11th to 13th-century sites, exhibited the least correlation to LCD villages and, upon visual inspection, appeared to be heavily skewed to certain

5 Many settlement sites have been found by the Keava expedition (see Lang 2012a).

6 In dating the sites, secondary sources, such as Lang (1996), Mandel (2003), the Archaeological Sites in Estonia database, and heritage site passports (National Registry of Cultural Monuments), were relied upon. Due to the involvement of different authors, the dating of the sites might not have been entirely consistent.

7 The results for the other two sets are not described under the Results section and are not provided in the main table (Table 2). However, the results of the cross-K analysis, along with the R scripts of the analysis procedures, are available in the data package in Siig (2024). Although the different sets yielded slightly varied results, especially in the smaller 2 and 5 km radii, the variation in the results across other sets is on average less than 10%.

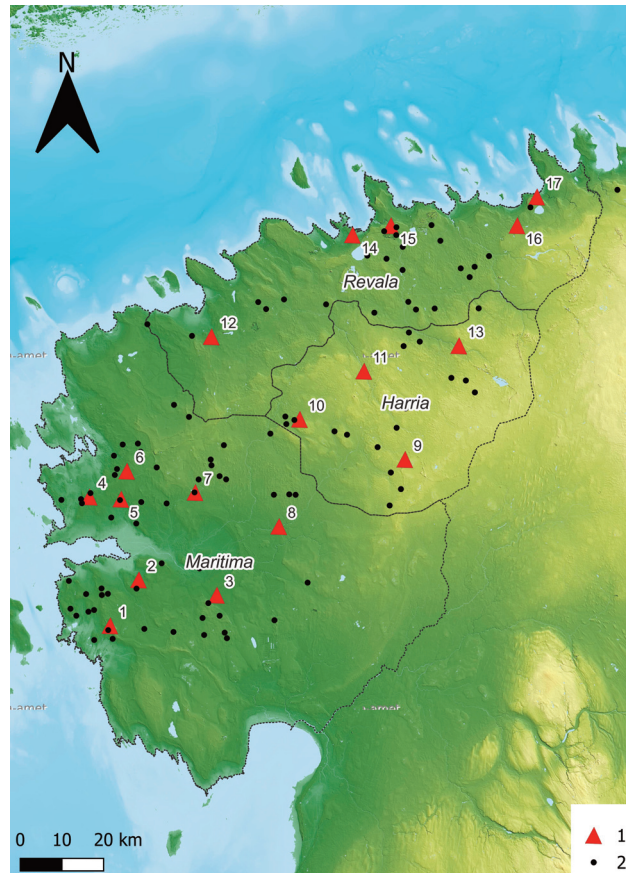
areas with more archaeological research (see Figs 4: a and 5). Therefore, dataset No. 2, which included all Iron Age sites with finds (Fig. 4: b), was chosen instead.

## Burial sites

In Estonian landscape archaeology, Iron Age cemeteries are often seen as markers of settlements in the absence of archaeologically detected settlement sites (cf. Lang 1996, 375–432; 2000, 21–23; Mägi 2002, 171–172). Graves often contain more elaborate finds that can be more easily dated compared to the more mundane objects from settlement sites.

However, it must also be noted that most of the archaeologically known burial sites have not been excavated. Although Iron Age cemeteries in Estonia fall into several chronological types based on their internal structure (cf. Lang 2007, 147–220; Tvauri 2012, 251–304), these features are often masked by turf or later heaps of boulders, which is why the type cannot always be easily determined simply by visual inspection. Therefore, it is often impossible to establish a more precise date than ‘Iron Age’. Another shortcoming is that while burial sites tend to lie near historical villages and farmlands, they might not represent the distribution of the entire population. For example, it has been established that only the elite, about 20% of the Iron Age population of Estonia, was buried in stone setting cemeteries, meaning that the rest of the people (and possibly entire settlement units) were subject to different burial practices (see Lang 2011). Therefore, while the existence of burial sites is evidence of settlement, the lack of cemeteries does not necessarily indicate the lack of settlement. For instance, there is a considerable deficit of burials in the 7th to 10th centuries in Estonia that has been thought to indicate a population decline (Tvauri 2014), but it might as well result from a change in burial customs and our ignorance of them (Mägi 2013, 110; 2018, 219–222). Additionally, earlier structures, such as *tarand*-graves, were often reused for later burials, further complicating dating efforts.

Nevertheless, the distribution of burial sites correlates with the distribution of villages and therefore should be included in the analysis. The dataset of burial sites was constructed based on the databases of the Estonian National Heritage Board (National Registry of Cultural Monuments) and the University of Tartu (Archaeological Sites in Estonia), supplemented and checked with the help of monographs on regional settlement history by Lang (1996) and Mandel (2003). Three different datasets were considered: 1) all Iron Age burial sites, 2) all Iron Age burial sites that have yielded finds archived in archaeological collections, and 3) all 11th to 13th-century burial sites. As many burial places consist of several stone structures that have often been registered as separate archaeological sites, sites within 500 m of each other were merged into one point. To choose one dataset that exhibits the best correlation to LCD villages, the same procedure was applied as described above, giving a similar result. As all datasets exhibited correlation to LCD villages up to 2 km, dataset No. 3, which included all 11th to



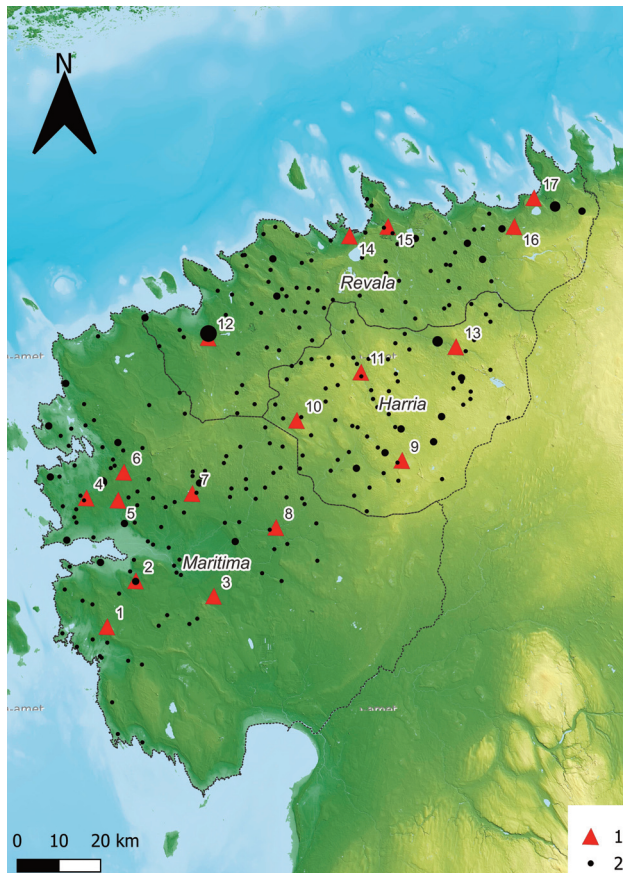
**FIG. 6.** The distribution of 11th–13th century grave mounds and cemeteries in the research area. 1 – strongholds, 2 – burial sites. For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

13th-century burial places, was chosen due to the fact that sites in this dataset have actually been dated to the period of interest. The spatial distribution of sites in dataset No. 3 can be seen in Fig. 6.

### Early modern manors

Based on the previously described logic that agricultural technology did not fundamentally change during the premodern period and that lands suitable for agriculture remained the same throughout the Iron Age, it has also been claimed that later manors occupied the same optimal locations in the landscape as the most prominent Iron Age villages or estates (Mägi 2002, 177–180). Therefore, the locations of later manors could also serve as a measure against which other proxies could be compared. The advantage of this proxy is that it contains actually inhabited sites and is not biased by the state of archaeological research (as is the case with settlement and burial sites).





**FIG. 7.** The distribution of early modern manors in the research area. 1 – strongholds, 2 – manors (the size of the symbol represents the size of the estate in ploughlands). For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

In this analysis, data from the 1725–1726 land revision (Einpaul & Naaber 1988a; 1988b; Kähr & Naaber 1990) are used (see Fig. 7). More specifically, the number of ploughlands recorded for each estate is considered a proxy for taxation potential. These data were collected on orders of the Russian imperial administration to determine the obligations of manor owners (particularly equestrian military duty), which was calculated as a function of the economic potential of the manor. The number of ploughlands<sup>8</sup> was summed based on the number of ploughlands per farm, which was determined mostly based on the

8 The term ‘ploughland’ did not stay the same throughout time. In the 13th century, when the LCD was written, it is thought to have denoted either one set of plough, yoke and draught animal, or a normal-sized farm requiring one such set and other inventory for cultivating its fields. By the 18th century, however, the term had acquired the meaning of a land surveying unit (Tarvel 1972, 205–219).

number of working-age persons living in each farm, but occasionally other variables, such as the extent of labour duty or the number of draught animals, were taken into account as well (see Einpaul & Naaber 1988a, 9–27).

However, these data also have significant shortcomings that must be taken into account. First, there is a considerable temporal gap – 500 years – between our period of interest and the time these data were collected. Second, the data were collected less than a generation after a major war (the battles of the Great Northern War on the Estonian soil ended in 1710) and a devastating plague that caused a catastrophic plunge in population and left many areas empty (see Laur 2003). Nevertheless, these revision data are the earliest published records that systematically represent the economic potential of all manors in Harjumaa and Läänemaa, making them the most suitable option for examining how Late Iron Age forts relate to later manors.

Similarly to settlement sites and burial places, the correlation of the locations of early modern manors to LCD sites was assessed using the cross-K function and the procedure described above. Again, the results show significant correlation at shorter distances, up to 2 km, validating the use of this dataset as a proxy.

## Results

### SOIL

Surprisingly, Varbola emerged as one of two most prominent strongholds in terms of surrounding fertile soils, consistently ranking in the top two positions across all radii (see Table 2). While this contradicts previous knowledge, values for other sites are as expected. For example, Lohu – described by Henry of Livonia as being located in the middle of the land (HCL XX, 2) – equals Varbola, ranking 1st in the 5 and 10 km and 2nd in the 2 and 20 km radii, while Soontagana – literally ‘behind the bog’ in Estonian – ranks near the bottom (16th within a 2 km radius, 11th within 5 and 10 km radii and 13th within a 20 km radius).

In general, using soils as a proxy seems to favour strongholds located in the Harjumaa region, especially its inland areas. Western Estonia (Läänemaa) appears to have featured fewer areas with fertile soils (see Fig. 3), which is consistent with the geographical descriptions of the area (EEEd). Concerning limitations, the consistently low rankings for Tallinn (last, i.e. 17th within 2, 5 and 10 km radii and 13th within a 20 km radius) must be discussed. In urban areas, the soil data do not reflect natural soils, as soils have been transformed by urban development and are marked as artificial. Nevertheless, Tallinn is surrounded by the sea to the north and several lakes to the south, making it unlikely that the stronghold was centrally located towards arable lands. Furthermore, the closest villages recorded in the LCD were located more than 5 km from the Toompea fort, and the natural landscape of the modern urban area mainly consisted of non-arable sandy heaths and marshes (Mägi & Karro 2015, 34–35; Tamm 2019, 91–93, 109), wherefore high centrality values were not expected. The limitations concerning urban areas

**TABLE 2.** Quantity of fertile soils around strongholds. For each radius, three values are provided: 1) the sum of raster cells with fertile soils in said radius, 2) the index of centrality (the normalised value of 1), and 3) the rank of the stronghold based on 2)

No.	Name	Number of settlements				Index of centrality (normalised 0 to 1)				Mean centrality	Rank				Mean rank
		2 km	5 km	10 km	20 km	2 km	5 km	10 km	20 km		2 km	5 km	10 km	20 km	
1	Vatla	2032	8770	34990	86458	0.51	0.46	0.44	0.23	0.41	4	6	12	7	
10	Varbola	3967	18220	66156	248817	1	0.97	0.93	1	0.98	1	2	1	1.5	
11	Lohu	3171	18734	70359	224881	0.8	1	1	0.89	0.92	2	1	2	1.5	
12	Padise	1342	6571	27255	113733	0.34	0.35	0.32	0.36	0.34	11	9	5	8.75	
13	Ahisilla	1685	14369	52051	173433	0.42	0.77	0.71	0.64	0.64	6	3	3	3.75	
14	Tallinna	0	130	7126	80027	0	0	0	0.2	0.05	17	17	13	16	
15	Iru	856	3858	17166	68452	0.22	0.2	0.16	0.15	0.18	14	14	15	14.25	
16	Kuusalu	1667	6803	21790	64784	0.42	0.36	0.23	0.13	0.28	6	8	13	10.75	
17	Muuksi	1369	3755	11843	37562	0.35	0.19	0.07	0	0.15	10	15	16	14.5	
2	Lihula	1210	4879	15678	94479	0.31	0.26	0.14	0.27	0.24	12	12	10	12.25	
3	Soontagana	100	5370	25557	79561	0.03	0.28	0.29	0.2	0.2	16	11	13	12.75	
4	Ridala	2240	6572	33787	90462	0.56	0.35	0.42	0.25	0.4	3	9	7	7.5	
5	Ehmja	1222	4970	30967	103077	0.31	0.26	0.38	0.31	0.32	12	12	8	10	
6	Leedi	1429	10366	38580	111809	0.36	0.55	0.5	0.35	0.44	9	5	7	6.5	
7	Kullamaa	1558	6976	28045	102411	0.39	0.37	0.33	0.31	0.35	8	7	9	8	
8	Konivere	558	2388	25201	112764	0.14	0.12	0.29	0.36	0.23	15	16	11	11.75	
9	Keava	1814	11363	48809	171368	0.46	0.6	0.66	0.63	0.59	5	4	4	4.25	

might slightly influence the results for Iru (14th within 2, 5 and 10 km radii and 15th within a 20 km radius) as well, although again the proximity to the sea also exhibits a negative influence on the amount of fertile soils available in its catchments. The same can be seen in low centrality rankings for Muuksi and Kuusalu at larger radii, as these forts were located in a narrow band of arable land between the sea and wetlands.

#### SETTLEMENT SITES

In terms of proximity to settlement sites, Varbola is characterised by high centrality at shorter distances (sharing the 3rd rank with two other sites within a 2 km radius and 4th rank within 5 km), declining to average levels at larger radii (9th within 10 km and 8th within 20 km). High values at shorter distances might reflect more intensive surveying around Varbola in the course of archaeological excavations at the site. The trend for Lohu is the reverse of Varbola (one site within a 2 km radius, ranking 10th within 5 km and 5th within 10 km, but 2nd within 20 km), but Soontagana again scores below average within all radii. It is important to note that this analysis does not account for size differences between settlements – according to the LCD, the settlement near Lohu (Loal) featured 27 ploughlands and one near Keava (Litnanas) had 14, while those near Varbola were smaller with 6–10 ploughlands (see Johansen 1933). There was also a larger than ordinary settlement site right beside the Keava hillfort during the Viking Age (Konsa & Kivi 2012). In this analysis, however, each archaeological settlement site has the same weight.

As for other sites, those in Harjumaa are generally again more central than those in Läänemaa (see Table 3). Keava and Iru stand out with high centrality values (Keava: two sites within a 2 km radius, ranking 4th within 5 km, 1st within 10 km and 3rd within 20 km; Iru: 5th within 2 km, 7th within 5 km and 4th within 10 and 20 km). This may be attributed to intensive archaeological surveying in their surroundings (for Iru, see Lang 1996; for Keava, see Lang 2012a).

Again, the results for Tallinn (one settlement within a 2 km radius, ranking 11th within 5 km, 8th within 10 km and 5th within 20 km) require clarification. Considering that Tallinn is thought to have been a trading centre with a harbour, which emerged in a border zone between multiple districts (see Johansen 1964/2006; Mägi 2015), and that there are no LCD villages within a 5 km radius of Toompea, the centrality values are somewhat misleading. The sites within the 2 km radius could represent non-agricultural sites connected to the harbour, being classified as settlement sites in the dataset, while the high values at larger scales probably reflect very intensive archaeological fieldwork around Tallinn (see Lang 1996).

#### BURIAL SITES

According to the index of proximity to 11th to 13th-century burial sites (Table 4), the relationship between Harjumaa and Läänemaa is almost turned around – here

No.	Name	Number of settlements				Index of centrality (normalised 0 to 1)				Mean centrality	Rank				Mean rank
		2 km	5 km	10 km	20 km	2 km	5 km	10 km	20 km		2 km	5 km	10 km	20 km	
1	Vatla	3	8	24	39	1	1	0.96	0.46	0.86	1	1	2	7	2.75
2	Lihula	1	5	15	45	0.33	0.62	0.58	0.54	0.52	5	4	7	6	5.5
3	Soontagana	0	1	7	20	0	0.12	0.25	0.19	0.14	13	11	12	12	12
4	Ridala	3	6	9	12	1	0.75	0.33	0.08	0.54	1	2	9	14	6.5
5	Ehmja	0	0	7	15	0	0	0.25	0.12	0.09	13	14	12	13	13
6	Leedi	0	0	3	10	0	0	0.08	0.06	0.04	13	14	16	16	14.75
7	Kullamaa	0	0	4	11	0	0	0.12	0.07	0.05	13	14	15	15	14.25
8	Konuvere	0	0	1	6	0	0	0	0	0	13	14	17	17	15.25
9	Keava	2	5	25	58	0.67	0.62	1	0.72	0.75	3	4	1	3	2.75
10	Varbola	2	5	9	38	0.67	0.62	0.33	0.44	0.52	3	4	9	8	6
11	Lohu	1	3	18	67	0.33	0.38	0.71	0.85	0.57	5	10	5	2	5.5
12	Padise	1	1	7	24	0.33	0.12	0.25	0.25	0.24	5	11	12	10	9.5
13	Ahisilla	1	6	24	78	0.33	0.75	0.96	1	0.76	5	2	2	1	2.5
14	Tallinn	1	1	10	48	0.33	0.12	0.38	0.58	0.35	5	11	8	5	7.25
15	Iru	1	4	21	51	0.33	0.5	0.83	0.62	0.57	5	7	4	4	5
16	Kuusatu	1	4	16	35	0.33	0.5	0.62	0.4	0.46	5	7	6	9	6.75
17	Muuksi	1	4	8	23	0.33	0.5	0.29	0.24	0.34	5	7	11	11	8.5

**TABLE 3.** Quantity of Iron Age archaeological settlements with finds around strongholds. For each radius, three values are provided: 1) the sum of settlement sites in said radius, 2) the index of centrality (the normalised value of 1), and 3) the rank of the stronghold based on 2)

No.	Name	Number of burial sites				Index of centrality (normalised 0 to 1)				Mean centrality	Rank				Mean rank
		2 km	5 km	10 km	20 km	2 km	5 km	10 km	20 km		2 km	5 km	10 km	20 km	
1	Vatla	1	2	11	16	1	0.5	1	0.59	0.77	1	6	1	6	3.5
2	Lihula	0	1	5	25	0	0.25	0.45	1	0.42	7	8	8	1	6
3	Soontagana	0	1	5	12	0	0.25	0.45	0.41	0.28	7	8	8	10	8.25
4	Ridala	1	3	8	17	1	0.75	0.73	0.64	0.78	1	2	4	5	3
5	Ehnja	1	3	10	20	1	0.75	0.91	0.77	0.86	1	2	2	4	2.25
6	Leedi	0	3	10	21	0	0.75	0.91	0.82	0.62	7	2	2	2	3.25
7	Kullamaa	1	2	7	21	1	0.5	0.64	0.82	0.74	1	6	6	2	3.75
8	Konivere	0	0	3	6	0	0	0.27	0.14	0.1	7	13	11	14	11.25
9	Keava	0	1	4	8	0	0.25	0.36	0.23	0.21	7	8	10	13	9.5
10	Varbola	1	4	6	12	1	1	0.55	0.41	0.74	1	1	7	10	4.75
11	Lohu	0	0	0	13	0	0	0	0.45	0.11	7	13	17	8	11.25
12	Padise	0	1	1	6	0	0.25	0.09	0.14	0.12	7	8	15	14	11
13	Ahisilla	0	0	3	14	0	0	0.27	0.5	0.19	7	13	11	7	9.5
14	Tallinn	0	0	3	12	0	0	0.27	0.41	0.17	7	13	11	10	10.25
15	Iru	1	3	8	13	1	0.75	0.73	0.45	0.73	1	2	4	8	3.75
16	Kuusalu	0	0	2	6	0	0	0.18	0.14	0.08	7	13	14	14	12
17	Muuksi	0	1	1	3	0	0.25	0.09	0	0.08	7	8	15	17	11.75

TABLE 4. Quantity of 11th to 13th-century grave mounds and cemeteries around strongholds. For each radius, three values are provided: 1) the sum of burial places in said radius, 2) the index of centrality (the normalised value of 1), and 3) the rank of the stronghold based on 2)

sites in Läänemaa dominate the rankings. This probably reflects intensive research on burial sites in Läänemaa by Mandel (2003).

Varbola ranked highest within the closest radii (being among the six forts that had a burial place within a 2 km radius and ranking 1st within 5 km) but showed a decline in influence at larger distances (7th within a 10 km radius and 10th within 20 km). Surprisingly, there seem to be few burial sites, especially ones dated to this period, near Lohu (none within 2 and 5 km radii, ranking 17th within 10 km and 8th within 20 km). For Soontagana, a peripheral position would be expected, but in respect to burial sites, it turns out to be rather average (no sites within a 2 km radius, ranking 8th within 5 and 10 km and 10th within 20 km).

#### EARLY MODERN MANORS

The 2 km radius seems to be too small for analysing proximity to manors, as only 9 of the 17 forts have an early modern manor in that proximity (Table 5; Fig. 7). The normalised scale for 2 km is also skewed by the outlier value of Padise (57 ploughlands – four times more than the second-ranking site within a 2 km radius). This stems from the fact that the stronghold is situated right next to the Padise estate, the largest in the 1725–1726 dataset, meaning that the ploughlands for a large area were centred in that point, not distributed across a wider area as in other regions.

Otherwise, the manor index roughly correlates with other indexes, validating its use. For example, Soontagana, a fort expected to exhibit low values due to its location in the middle of large wetland areas, is consistently among the least central (no manors within a 2 km radius, ranking 16th within 5 km and 17th within 10 and 20 km), providing validation for the results. At the same time, Lohu is consistently above average in terms of centrality (4th within 2, 5 and 20 km radii and 7th within 10 km).

Varbola's position in this index varies significantly: within the 2 km radius, it ranks 6th, but 'falls behind' within the 5 and 10 km radii (10th and 11th, respectively). However, within the 20 km radius, Varbola becomes quite central, rising to the 5th rank among the 17 forts.

Interestingly, the results for manors differ from the previous analyses in that there is no clear difference between sites in Harjumaa and Läänemaa.

## Discussion

#### THE 'EDGE EFFECT'

The first and most notable conclusion from these results is that Varbola was not located in a significantly more peripheral or sparsely populated area compared to other strongholds of the period. While its location did not stand out as strikingly more central than others, as was the case with Rakvere in the region of Virumaa (see Siig 2022), it could be described as slightly above average central, rather than peripheral.

No.	Name	Number of ploughlands				Index of centrality (normalised 0 to 1)				Mean centrality	Rank				Mean rank
		2 km	5 km	10 km	20 km	2 km	5 km	10 km	20 km		2 km	5 km	10 km	20 km	
1	Vatla	0	8	24.5	94.5	0	0.14	0.19	0.07	0.1	10	13	15	16	13.5
2	Lihula	13	14.5	47.5	136	0.23	0.25	0.48	0.31	0.32	2	6	10	12	7.5
3	Sootagana	0	0	9	82.5	0	0	0	0	0	10	16	17	17	15
4	Ridala	5.5	10	90	241.5	0.1	0.18	1	0.92	0.55	3	10	1	2	4
5	Ehmja	0	9	77.5	255.5	0	0.16	0.85	1	0.5	10	12	4	1	6.75
6	Leedi	0	12.5	85	234.5	0	0.22	0.94	0.88	0.51	10	7	2	3	5.5
7	Kullamaa	1	28	48.5	169	0.02	0.49	0.49	0.5	0.38	9	3	9	9	7.5
8	Konuvete	2	6.5	36	104	0.04	0.11	0.33	0.12	0.15	7	14	12	14	11.75
9	Keava	3.5	22	68	182.75	0.06	0.39	0.73	0.58	0.44	5	4	6	8	5.75
10	Varbola	3	10	40.5	207	0.05	0.18	0.39	0.72	0.34	6	10	11	5	8
11	Lohu	4.5	22	64	221	0.08	0.39	0.68	0.8	0.49	4	4	7	4	4.75
12	Padise	57	57	85	202.5	1	1	0.94	0.69	0.91	1	1	2	7	2.75
13	Ahisilla	0	42.5	72.5	205.5	0	0.75	0.78	0.71	0.56	10	2	5	6	5.75
14	Tallinn	0	5.5	20	141	0	0.1	0.14	0.34	0.15	10	15	16	10	12.75
15	Iru	2.5	12.5	54.5	132.5	0.04	0.22	0.56	0.29	0.28	7	7	8	13	8.75
16	Kuusalu	0	12	26.5	138	0	0.21	0.22	0.32	0.19	10	9	14	11	11
17	Muuksi	0	0	30	103	0	0	0.26	0.12	0.1	10	16	13	14	13.25

**TABLE 5.** Quantity of early modern manors around strongholds. For each radius, three values are provided: 1) the sum of ploughlands of manors in said radius, 2) the index of centrality (the normalised value of 1), and 3) the rank of the stronghold based on 2)



This conclusion directly contradicts previous works on Varbola. The reason for previous scholars' perception of Varbola's location as peripheral might lie in the 'edge effect' and the nature of the LCD data. This tax record has had a significant impact on the research of Estonian settlement history. The LCD serves as the earliest written record for hundreds of northern Estonian villages, with subsequent written sources appearing centuries later. However, such a rich dataset only exists for two regions – Harjumaa and Virumaa (also known as the Duchy of Estonia). The neighbouring regions of Läänemaa and Järvamaa lack similar data, which is why information about their 13th to 14th-century settlement is considerably patchier.

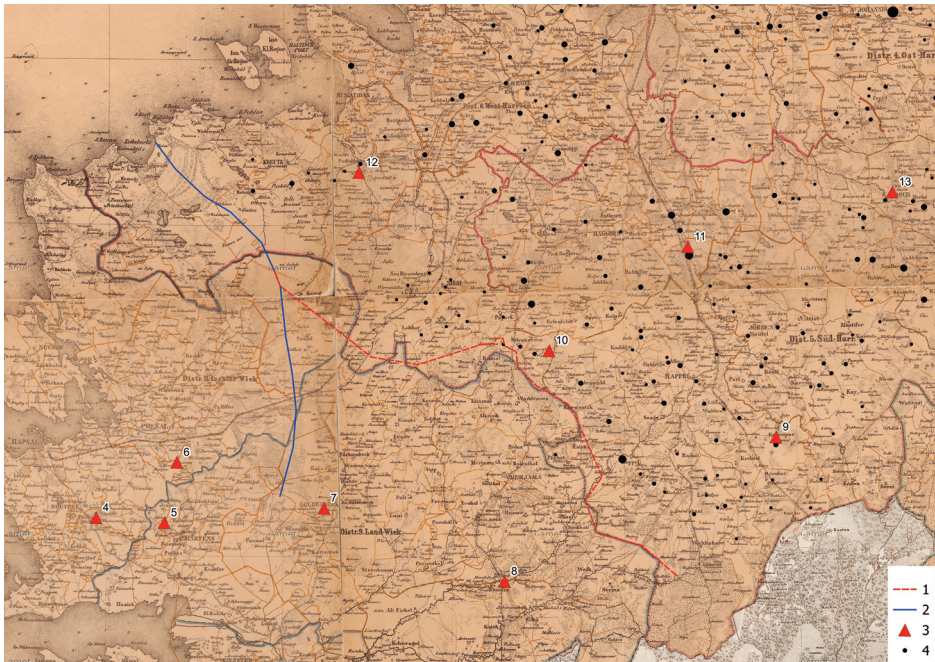
This edge has also affected the archaeological record as the villages of Harjumaa recorded in the LCD have been more extensively surveyed. Consequently, more settlement sites have been found in Harjumaa than in the eastern part of Läänemaa. To what extent can this difference be explained by state of research and to what extent by actual distribution of population, is difficult to estimate precisely. However, the use of several different proxies in the analysis above helps balance this situation.

Varbola lies exactly at the edge of the area covered by the LCD data (see Figs 1 and 8). However, does this edge coincide with a natural border between settlement regions? Previously, it has been assumed so, as the districts mentioned in the LCD and the Chronicle of Henry of Livonia (known as *maakond* in Estonian research tradition) are often thought to have corresponded to ancient tribal areas or cultural regions separated by uninhabited border zones of bogs and forests (cf. Laid 1936, 201–204; Lang 2002, 156; Valk 2020b, 362–363). Moreover, most studies have systematised archaeological material according to the historical provinces of Läänemaa and Harjumaa (e.g. Mandel 2003), leading to the impression that these are natural categories. The border between the Duchy of Estonia and the Bishopric of Ösel–Wiek, described sometime between 1275 and 1285 (LUB III, 439), and the historical border between Harjumaa and Läänemaa follow more or less the same line as the edge of the area covered by LCD data<sup>9</sup> (see Fig. 8). However, when looking at both topographical and historical maps, it is clear that the natural border zone of bogs and mires, separating the western Estonian settlement areas from Harjumaa, is actually 10–15 km to the west, along the Nõva–Risti–Liivi line (see Fig. 8). It seems that there were plenty of settled areas in the later Märjamaa and Kullamaa parishes in the vicinity of Varbola but beyond the 'edge' described above, thus excluded from the LCD dataset.

Furthermore, there is ample evidence of connections across this 'edge'. Markus (2007) discusses the localisation of a parish named Hertele mentioned in 13th-century sources, located somewhere between the regions later known as Harjumaa and Läänemaa. However, the name does not turn up in later sources, meaning that the district probably dissolved into other parishes.<sup>10</sup> Markus argues

9 Another opinion connects Hertele to the later parish of Nissi (Johansen 1933, 206).

10 It must be noted that a literal reading of the document would place Pühatu (Piatae) and Hiietse (Egentakaes), mentioned in the LCD, in Ösel–Wiek. In the 19th century, however, they were included in Harjumaa (Schmidt 1844).



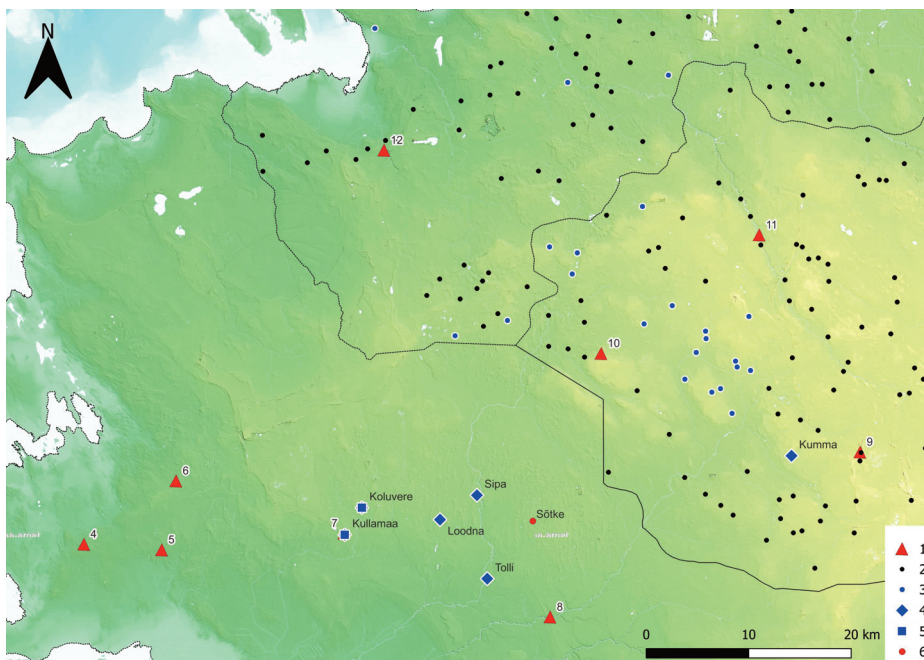
**FIG. 8.** The border zone between Läänemaa and Harjumaa. 1 – border between Ösel–Wiek and the Duchy of Estonia recorded in ca 1280, 2 – suggested natural border line (Nõva–Risti–Liivi), 3 – strongholds, 4 – villages recorded in the Liber Censu Daniae (the size of the symbol represents the size of the manor in ploughlands). For specific strongholds, see Fig. 1 caption. Basemap: Schmidt's map of 19th-century northern Estonia, provided by the Estonian Land Board.

that this parish consisted of the lands around Varbola, including the later parishes of Kullamaa and Märjamaa. She also points to a late 13th-century border document, noting how the local population took down a tree marking the border between the Duchy of Estonia and the Bishopric of Ösel–Wiek (LUB III, 439), and suggesting that the locals did not accept the (new?) border.

The text of the LCD provides another clue, describing how prior to the compilation of the final document,<sup>11</sup> the brothers of the Order (initially the Order of the Sword Brethren, later the Teutonic Order) had 900 ploughlands in Harria, along with those in Hetkyl<sup>12</sup> (Johansen 1933, 825). Hetkyl itself is not part of the LCD list, and according to Johansen (1933), it can be identified as Sõtke in the

11 This denotes the years after 1227 and before the Treaty of Stensby (1938), when the Order of the Sword Brethren ruled in northern Estonia. The historical records from this period are scarce, mostly consisting of complaints from other actors against the Order, which was said to have violently taken hold of lands in northern Estonia (see Johansen 1933, 702–733; Andersen & Raudkivi 2008; Selart 2009).

12 *Temporibus fratrum fuerunt 280, quos domino regi reliquerunt, et in Laidus 15; et in Haria 900 cum istis, qui sunt in Hetkyl* (During the times of the brothers, there were 280, which they left to the lord king, and in Laidus there were 15; and in Haria, 900, along with those which are in Hetkyl. – Translation by the author.).



**FIG. 9.** Land holdings of the Lode family around Varbola. 1 – strongholds, 2 – villages recorded in the Liber Censu Daniae, 3 – villages belonging to the Lodes according to the LCD, 4 – estates enfeoffed to Odeward de Lode in 1196, 5 – strongholds held by the Lodes in Läänemaa before 1238, 6 – Sõtke village, mentioned in connection with the Order’s past holdings in Harjumaa. For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

later parish of Märjamaa (see Fig. 9) in the province of Läänemaa. The wording in the LCD implies that there was an unspecified number of ploughlands in Sõtke and that they were in an ambiguous state – partly seen as belonging to Harria and partly viewed separately. Whether Sõtke was just one village or an estate or entire district is unknown.<sup>13</sup>

13 Johansen (1933, 360) identifies Hetkyl as a holding of 50 ploughlands given by the Bishop of Ösel–Wiek to the Teutonic Order in an agreement made in 1238 (LUB I, 156), connecting these 50 ploughlands in Maritima or Osilia (*quingaginta uncas in Maritima vel Osilia*) to the estates of Lihula, Matsalu, Sõtküla and Sauga, which are mentioned three centuries later in Renner’s chronicle of Livonia (CL, 159). Sõtke, located close to Harria (while the other estates are situated in distant parts of Maritima), would have been mentioned in the LCD simply due to its proximity. According to this interpretation, Sõtke would be an estate of ca ten ploughlands. However, this connection is not entirely unproblematic. The Order lost its holdings in Harria in June 1238, and the phrase about past holdings there (*temporibus fratrum fuerunt*) must have been written around that time or slightly later. At the same time, the Order only obtained holdings in Maritima (possibly including Hetkyl) in February 1238. Why then mention Harria and Hetkyl as part of the same group if the holdings had different origins, the connection was only very recent and Hetkyl later remained in the Order’s possession?

Lastly, landholdings on both sides of the 'edge' seem to have been natural. The Lode family controlled the areas of Kullamaa and Koluvere before 1238, but were excommunicated by the Bishop and driven out by the Teutonic Order (LUB VI, 2723–2724). Interestingly, the main domain of the Lodes in the LCD is centred in an arc around Varbola (see Johansen 1933; Fig. 8). Plotting these data on one map suggests that the Lode family's domain originally formed a cohesive whole, extending to both sides of the 'edge'. Maybe Harria originally included the parishes of Kullamaa and Märjamaa (and possibly even Vigala?), but after the Lode family was driven out, the border between Läänemaa and Harjumaa crystallised along a line further east, a new border reflected in the LCD data.

Scholars have long been puzzled by the fact that while the small Estonian list of the LCD<sup>14</sup> mentions three districts (*kiligunda*) in Harriaen, no districts are mentioned in the large list, and initially only two parishes (Haccriz and Koskil) were established in the area (Johansen 1933, 188). At the same time, there were seven *kiligundas* in the neighbouring Maritima, each with a distinct name (1. Hanilae – later Hanila; 2. Leale – Lihula; 3. Rotelewich/Rotalia – Ridala; 4. Sontagana/Maritima – Mihkli, Audru, Pärnu; 5. Korbe – Pärnu-Jaagupi, Vändra, Tori; 6. Cotze – Karuse; 7. Svorue – Varbla, Tõstamaa; see Tarvel 1971), leaving no room for the later Läänemaa<sup>15</sup> parishes of Kullamaa, Märjamaa and Vigala. It is plausible that, at the time of compiling the small list (beginning of the 1230s according to Johansen 1933, 112), the areas of Kullamaa, Märjamaa and Vigala formed one *kiligunda* belonging to Harria rather than Maritima.

This would, however, mean that the names and numbers of ploughlands of the villages recorded in the small Estonian list of the LCD were noted only in the 1230s, after the change in the allocation of Kullamaa, Märjamaa and Vigala. This contradicts Johansen's theory that this information was written down in 1219–1220 by missionary monks baptising the population, with details about landowners added after the Treaty of Stensby (1238), when Denmark regained the Duchy of Estonia from the Order (Johansen 1933, 113–147). It is clear that the manuscript of the large Estonian list of the Liber Censur Daniae (see in Data above) has two temporal layers: the village list and notes added to the side (e.g. information about landowners). The latter was written shortly after 1238, but the dating of the former is a mere hypothesis.

Another possibility is that land ownership and/or political territories did not coincide with provinces such as Maritima, Harria and Revele as described in

14 A list of regions of Estonia (excluding Saccala and Ugandi, two regions in southern Estonia) along with their corresponding number of ploughlands; part of the manuscript of the LCD but separate from the large Estonian list referred to elsewhere in this paper (see Johansen 1933, 103–112).

15 The Estonian name Läänemaa (meaning 'Western land') has been given from the perspective of Harjumaa (located to the east of Läänemaa) and is first attested in sources in 1574. Laakmann (1938) and Tarvel (1971) connect the name originally to an ancient parish in the territory of the later Märjamaa, Kullamaa and Vigala parishes.

written sources. Lang (2002, 151–156) argues that these provinces should be seen as cultural or tribal areas, representing a separate system from estates and polities. In this case, the fort district of Varbola might have stretched across provincial borders and the ‘edge’ noted in the LCD data. This possibility is hinted at but not thoroughly examined by Tõnisson (1999, 183) and Lang (2012b, 218–219).

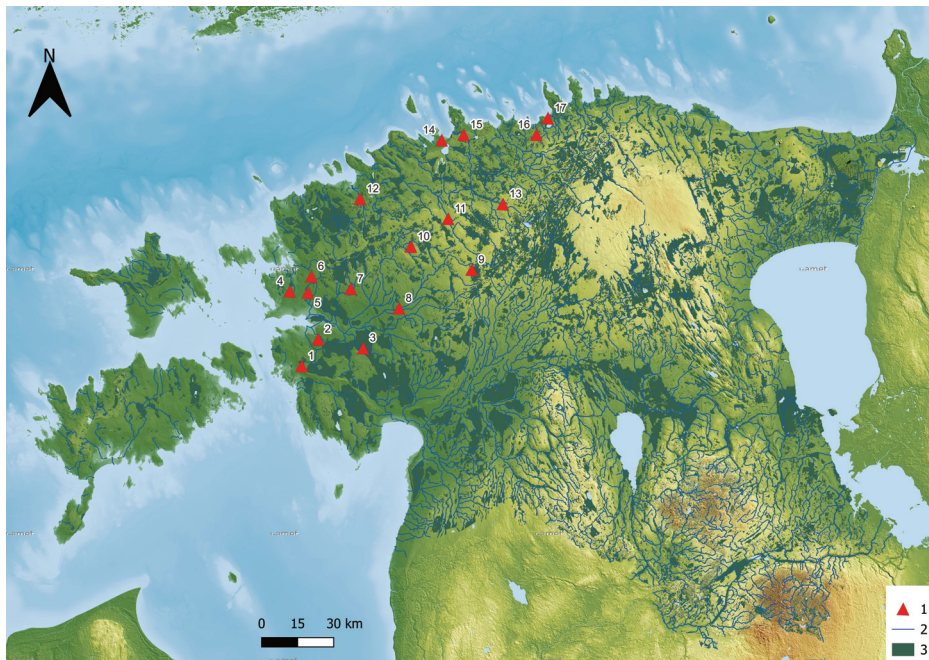
In any case, this ‘edge’ might have had a significant effect on the perception of Varbola’s topographic location. First, Varbola was perceived as lying on the border of the Harjumaa region, although this was not a natural border. Second, the distribution of LCD villages to the north and east of Varbola, contrasted with a lack of data to the west and south, seems to have fed the impression that the latter areas were sparsely populated. This perception might have been further reinforced by the state of research, as there are considerably more archaeological settlement sites in the areas documented by the LCD compared to eastern Läänemaa.

#### RENEWED DISCUSSION ABOUT FUNCTION

If Varbola is not peripheral as previously thought, it opens up new discussions about the stronghold’s function. Judging by its size, several orders of magnitude larger than other forts in the area, Varbola would be expected to be a major centre of power with a correspondingly large hinterland. While the results from spatial analysis do not show such correlation between stronghold size and centrality towards settlement areas and rather describe Varbola as ‘average’ or ‘slightly above average’ in terms of centrality, it nevertheless becomes possible to consider the hypothesis of Varbola being a power centre, but this requires an examination of other possibilities and sources of information.

The main alternative hypothesis suggests that Varbola was predominantly a trade centre. In terms of topographical location, several arguments have been made in favour of this. First, Vardi, a tributary of the River Kasari flows close to Varbola (Markus 2007). However, the simple vicinity of a river is hardly sufficient for the emergence of a trade centre, even if the river was wider in ancient times than the currently insignificant stream. A node in a trade network would be expected in a place that is logistically in between and on the way from one economic area to another. From the perspective of international trade – which at that time in northern Europe was mostly maritime trade –, the Vardi stream represents a dead end. Ships and merchants might have accessed the site, but there was no potential for transit (cf. Westerdahl 1992, 6), as they could not continue anywhere. Furthermore, river towns usually emerge at crossing points where river routes meet land routes, e.g. Tartu, Pärnu and Narva. Nothing like that has been suggested for Varbola.

Mägi (2020) argues that the potential for transit was offered by winter routes across frozen wetlands and lakes. Ships would arrive from the sea in the summer navigation season, then wait in the stronghold and continue in the winter towards



**FIG. 10.** Strongholds and their locations in relation to wetlands and major rivers. 1 – strongholds, 2 – rivers, 3 – wetland areas (peat soil). For specific strongholds, see Fig. 1 caption. Basemap: coloured hill shading elevation map provided by the Estonian Land Board.

the east (e.g. to Novgorod) across frozen landscapes. However, there is no continuous east-west wetland area to the east of Varbola that could serve as a winter route; instead, there are small patches of wetland that are oriented northwest-southeast (see Fig. 10). Even though winter routes might have also crossed agricultural fields, the exact location of these routes is unknown and there is no evidence that Varbola's location made it particularly better positioned for winter routes than any other place. Much more likely locations for transitioning from maritime transport to winter routes towards the east would have included places such as Lihula, Konuvere, Soontagana or Pärnu.<sup>16</sup>

Lang (2012b, 218–219) suggests that Varbola was not a hub for long-distance trade but a more local-scale proto-urban centre, where inhabitants subsisted mostly by exchanging craft products and imported goods for primary products from the hinterland. However, when he rules out Varbola as a political centre supported by dependant areas, because this 'would require much more developed

16 On the other hand, Varbola might have had access to the harbour in Tallinn. Johansen (1964/2006, 116) suggests that a corridor belonging to Harjumaa and projecting northwards into Revelle towards Tallinn might be a trace of a system, where an inland region had access to a sea harbour, as known from Finland (*portus* Tauestorum) and Semgallia (*portus* Semigalliae). In this case, Varbola itself would not have served as a marketplace but rather as a user of the harbour in Tallinn.

feudal relations than present at the time', it is unclear why the same scepticism does not apply to specialisation and market relations. Proto-urban centres are known from Viking Age northern Europe, but they were located at important logistical nodes in the international trade network and often controlled by an elite actor (see Skre 2008). An independent urban community with a huge fortification and political agency (see below) unrelated to international trade is unprecedented. Moreover, the archaeological material from Estonian Iron Age hillforts (including Varbola), namely the lack of traces of standardised production, does not suggest market-oriented trading places like Scandinavian proto-towns (Tvauri 2002). Instead, these sites fit the model of aristocratic centres that provided some central place functions for an area, but primarily engaged in commissioned production for individuals. At the same time, the archaeological material from Varbola does not qualitatively differ from other hillforts (cf. Tvauri 2002; Luik 2004).

Another argument suggests that Varbola was located on the border of three regions – Harria, Revele and Maritima (Markus 2007, 16–20; Lang 2012b, 217–219; Fig. 1) –, a common feature of Viking Age trading centres in northern Europe (see Hodges 1989, 52–53) and elsewhere.<sup>17</sup> This is perhaps the best-founded argument, although it is also possible that such a border location would have been chosen to control a domain that combined areas in three culturally distinct regions. An analogy for this can be found in Sweden, where the 12th–13th-century castle of Näs, referred to in written sources as one of the most important centres of the Swedish king, was located almost at the point where Västergötland, Östergötland and Småland meet (Line 2007, 316–317).

Finally, one indicator for a Viking Age and Final Iron Age trade centre would be the concentration of nearby coin hoards (Mägi 2018, 327–331). That is not to say that coin hoards should be found at the trading site itself; more often, one would expect to find them diffused in the hinterland, as people visiting a trade centre brought the coins to their settlements in the hinterland and buried them. However, apart from one Final Iron Age hoard of 64 German coins (Tönnisson 1962, 191), the areas around Varbola do not exhibit a concentration of coin hoards comparable to known trade centres, such as can be seen on the western and northern coasts of Estonia (ibid.; Mägi 2018, 409, fig. 7.19; see also Valk 2020b, 394, fig. 179). The comparative lack of silver hoards in the area should not be taken as indicative of a lack of wealth but rather of a modest number of commercially active and thus above-average wealthy people or households in the vicinity. In 1212, the Varbolans paid 700 marks of silver as ransom to the Novgorodians (see below), indicating that if needed, Varbola commanded considerable finances. However, considering the lack of hoards, the wealth in

17 For example, in Early Iron Age central Europe, many centres previously interpreted as princely seats with corresponding territories have turned out to be located at the edges of cultural areas, acting as gateway sites connecting different areas (Nakoinz 2018).

Varbola seems to have been concentrated among a few rather than distributed widely among many economic agents (as could be expected in a corporately administered proto-town), allowing for rapid use during a siege.

#### VARBOLA IN WRITTEN SOURCES

As spatial evidence is ambiguous, written sources<sup>18</sup> should also be investigated. Varbola is first mentioned in written sources in 1212, when both Henry of Livonia and the First Novgorod Chronicle describe how Mstislav, Prince of Novgorod, besieged and attacked Varbola. According to Henry, Mstislav originally intended to meet German crusaders in Järvamaa, but upon not finding them there, his 15 000-strong army turned to Varbola (HCL XV, 8). The Rus'ian sources mention destroying small forts (*oceku*) before arriving at Varbola, which is referred to as *zopod*, meaning either town or castle (FNC, л. 144). After a few days of siege and battles, Mstislav's army left as the people in the fort offered 700 marks as tribute. Mstislav's aims seem to be a mix of politics and raiding, but distinguishing Varbola as a *zopod* among *oceku* and choosing to attack Varbola (instead of other forts on the way back in Virumaa, Järvamaa, Vaiga or Ugandi) indicates that Varbola was the most important fort and a site of major accumulation of wealth in central and northern Estonia. This piece of information, however, does not favour either function – there could be significant financial resources in a trading hub, but similar funds could be extracted by a power centre through taxation.

Further on, Henry describes an incident in 1219, when crusaders from Riga were raiding Harria and, stationed at Lohu (Lone), met envoys of the Varbolans, who asked them to leave their borders.<sup>19</sup> Finally, peace was made when the Varbolans gave hostages and accepted baptism. This passage suggests that, at that time, the Varbolans were a political actor making peace agreements and accepting Christianity (see also Oad 2014), and, more importantly, controlling their own territory, which may have extended at least to Lohu in the east.<sup>20</sup>

18 Of these, three are relevant for this study: the LCD (see above), HCL and the FNC.

The first two were written in the first half of the 13th century and are basically contemporaneous with each other and the events regarding Varbola described in them. The relevant part of the FNC was recorded in the second half of the 13th century (Selart 2015, 8–11); however, other than dating Mstislav's campaign, the information concerning Varbola is well corroborated by the HCL and there is no indication that it should be discarded (Vahtre 1990, 89).

19 *Miserunt autem ad nos Warbolenses, rogantes ea, que pacis essent, et ut de finibus eorum exiremus* (HCL XXIII, 9) (The people from Warbole sent to us asking for terms of peace and for us to leave their territories (Brundage 1961)).

20 Since the crusaders were stationed at Lohu, one way to interpret the passage is that Lohu fell within those borders. Alternatively, as units of crusaders were raiding throughout the province, some might have gone to areas closer to Varbola, and the Varbolans only came to Lohu to speak to the leaders of the expedition, meaning that the territory in question did not include Lohu. However, with the second interpretation, one would expect the raiders to continue raiding the rest of Harria after reaching an agreement with the Varbolans. Instead, they communicated with the Danes, returned the hostages, and left to Livonia.



Later, the crusaders returned the hostages ‘of that Harrian province’<sup>21</sup> at the request of the Danes, suggesting that Varbola was considered a province within Harria. In 1222, Henry mentions the Varbolans as subjects of the Danes, who provided them with a trebuchet.<sup>22</sup> All of this suggests special relations with the Danes.

Subsequently, Varbola served as a gathering point for the pagan insurrection in Maritima and Harria (HCL XXVI, 5). The Varbolans (without mention of other people from Harjumaa) took part in two Osilian-led sieges of the Danish fort at Lyndanise (HCL XXVI, 11; XXVII, 3), and finally offered tribute to the Bishop of Riga (HCL XXVIII, 7). While these passages paint a complex and ambiguous picture of Varbola’s allegiances and its relationship with the rest of Harria, there is no indication in the written sources about Varbola being a trade centre. Although Henry does not specifically mention any trade centres (with the exception of Riga and the Sengallian harbour, which are clearly identified in the context of trade; HCL IV, 7), the absence of mention in his chronicle cannot be taken as proof of non-existence.

Nevertheless, the events and actions related to Varbola are more similar to those of Viljandi and Otepää, generally considered to be power centres (Valk 2020a). The Varbolans make agreements, offer tribute, give hostages, have their stronghold besieged, and take part in military campaigns. At the same time, the known trading sites mentioned by Henry do not exhibit such agency: Tallinn (Lyndanise) is simply a landing site for the Danes to build their fort (HCL XXX, III), while Lihula is mentioned as the site of a bishop’s appointment and a landing point for the Swedes to build their fort (HCL XXIV, 3). As for Tartu, it initially only comes up as a place where people pass by to cross the river (HCL XV, 7; XIX, 3; XXIV, 1) and as a fort destroyed earlier by the Latgallians (HCL XV, 7). It is only in 1223, during the pagan uprising, that the fort acquires political significance, as the Sword Brethren are driven out, and the fort is given in the hands of the Novgorodians and Prince Viesceka (HCL XXVI, 8; XXVII, 3–4).

In addition to the chronicles, information about Varbola is recorded in the LCD. While this information could not be used in the quantitative spatial analysis due to the ‘edge effect’, it can and should be included in the discussion part. The village of Varbola (Uarpal)<sup>23</sup> has 10 ploughlands, significantly fewer than the village next to Lohu (Loal, 27 ploughlands), which may have contributed to the perception of Varbola as peripheral. The village of Varbola was owned by a small vassal named Tuvi Cols, while several villages close by (Paihak, Hopasal and

21 *Obsides quidem presentis provincie Harionensis patribus eorum restituimus ...* (HCL XXIII, 10) (Then, leaving there the hostages of that province, we returned... (Brundage 1961)).

22 *... patherelli, sive machine ...* (HCL XXVI, 3) (... paterell or the machine ... (Brundage 1961)).

23 Likely modern Põlli; the modern village of Varbola lies to its west.

Kiriuaer with 6, 6 and 7 ploughlands, respectively) were owned by Pæter Tolk, possibly a vassal of Estonian origin (Johansen 1933, 834). Valk (2014) suggests that Tuvi Cols was a local noble who owned the fort and surrounding lands in the pre-crusade period, and later received small enfeoffments near the stronghold and continued to live in the fort throughout the 13th century (similar arrangements might have existed at Purtse and Lohu).

#### VARBOLA AND THE LODE FAMILY

However, when zooming out, we discover that Varbola was surrounded by lands held by the powerful Lode family (Markus 2007; see Fig 8). Villages owned by the Lodes, as recorded in the LCD at the beginning of the 1240s, lied to the north and east of Varbola, while Kullamaa and Koluvere, which they seemed to have controlled before 1238, were located to the west.

Recently, a thorough analysis has been published on the origins of the Lode family (Oad 2023). Two conclusions in particular are relevant for this study. The first concerns Johansen's theory that the Lodes arrived from Germany to Läänemaa after 1227 and then gained their northern Estonian lands after 1238. The analysis demonstrates that there is no source information to back up either claim; rather, the sources contradict the idea of the Lodes' possible migration from Germany. The second conclusion concerns a document dated to 1196, which the Lodes successfully used in litigation in 1528, although it has since been lost. According to this document, an Odeward Lode became a vassal of King Canute VI of Denmark, with holdings extending from Tolli in Läänemaa to Kohtla in eastern Virumaa. Though the early date raises suspicion of forgery, comparisons with known forgeries from medieval Livonia show that, unlike the forgeries, this document was historically precise and such a forgery would have required access to information that the Lodes probably did not have. Furthermore, the year 1196 coincides with Canute's campaign in Estonia, and kings Valdemar I, Canute VI and Valdemar II similarly became seigneurs of local lords in other coastal regions of the Baltic Sea. Thus, the evidence supports an interpretation that the Lodes were not German immigrants but rather a local Estonian noble family that became vassals of the King of Denmark as early as 1196.

The Lodes were the largest landholders in northwestern Estonia after the Danish king, but according to the LCD, only a small handful of their holdings lied outside the western part of Harria. While there were some small fiefs not owned by the Lodes around Varbola, the holdings of the Lodes constituted quite a compact area, and the small fiefs could be seen as the subvassals of the Lodes (for subvassals in the LCD, see Johansen 1933, 676–763; Kaljusaar 2022). Family holdings should be viewed as a whole, as power in Iron Age Estonia is thought to have been not individual but corporate or kin-based (Mägi 2013; Oad 2014). Given that Varbola lies at the heart of these compact holdings in Harjumaa and Läänemaa, it would make sense that Varbola was a centre of the Lode domain.

This, in turn, fits well with a power centre interpretation. Of course, this does not exclude some trading functions. Although Varbola apparently did not have any natural or geographic prerequisites to stand out as a trade hub per se, such a military, administrative and probably fiscal centre would naturally have also attracted a community of craftspeople and traders. Furthermore, interpreting Varbola as a centre of the Lode domain does not mean that it was the elite residence. It is possible that the fort was a bunker of sorts, used for shelter during military raids, while most of peacetime was spent in a manor nearby<sup>24</sup> (cf. Mägi 2013, 119; 2020, 51).

#### THE HINTERLAND OF VARBOLA

The question of how the population of Varbola sustained itself seems to have puzzled previous scholars to a significant degree, as the remains of ca 90 stone piles, likely corresponding to stoves, and building remains suggest a population of up to 1,000 people (more likely 500). It is unclear whether all these structures were in use at the same time. Nevertheless, the sheer size of the fortifications means that in any case, a large crew was needed to man the site, indicating that a substantial hinterland would have been required to provide sufficient resources.

The size of Varbola can also be explained much more simply if it was built by the Lodes. Considering the lands held by the Lodes in the 1230s, the original hinterland of Varbola would have consisted of at least the northeastern part of Läänemaa along with the western part of Harjumaa, giving a conservative estimate of 500 or more ploughlands.<sup>25</sup> However, it is also possible that at some time around 1196, the Lodes (regarded as an Estonian noble family by Oad) controlled (or at least claimed to control) entire northern Estonia between Tolli and Kohtla (see Oad 2023), suggesting a hinterland many times larger than the core domain described above. Even if the lands mentioned in the (not preserved) 1196 document do not reflect actual holdings but rather a territorial ambition, it would give a good explanation for the enormous size of Varbola.

Previously, scholars have also searched for a hinterland or fort district for Varbola, coming up with tallies ranging from 470 ploughlands (Johansen 1933, 189–190) to 300 (Tõnisson 1999, 183) and 200–250 (Lang 2002, 150). Most of

24 The existence of ‘ancient manors’ (*muinasmõisad*) as elite estates and residences has been hypothesized based on analogies from neighbouring countries by most archaeologists dealing with Iron Age Estonia (Lang 1996, 479–482; Mägi 2002; Valk 2020a, 91). However, the lack of extensive excavations at archaeological settlement sites and the ambiguity of archaeological remains (there is no agreement on what kind of archaeological remains prove the existence of an ‘ancient manor’) leave them as an elusive category.

25 This number encompasses the holdings of the Lodes in western Harjumaa, including villages enfeoffed to someone else (ca 350 ploughlands), to which a rough and conservative estimate of 150 ploughlands from the Kullamaa, Märjamaa and Vigala (?) parishes should be added.

these hinterlands are drawn somewhat artificially, carving out elongated areas along the western edge of Harria. This is because these interpretations need to accommodate a separate territory for Lohu, the second largest fort in the area by size and volume of earthworks (see Siig 2015, 73, 100) and seen as a Final Iron Age political centre in its own right (Lang 2002; 2012b; Markus 2007).

However, it is possible that Lohu Jaanilinn (Lohu I) was only constructed during the 1223–1224 pagan uprising. Lohu (Lone) is mentioned in 1216 and 1220 (HCL XX, 2; XXIII, 9), but only as a *villa* (manor or village) ‘in the middle of the land’, where the crusaders set up camp. If the fort existed already back then, the chronicle would surely have mentioned its besieging. The stronghold (*castrum Lone*) is only mentioned in 1224, when the crusaders came to Harjumaa to suppress the pagan insurrection (HCL XXVII, 6). Archaeology does not help us resolve this question, as there have only been very limited excavations in 1914 and 2015 that yielded only potsherds, an axe and a belt buckle (Lang 2012b, 208; Mäesalu et al. 2015). However, the courtyard seems uneven and surveys of molehills show no evidence of finds or remnants of heated stones, indicating short-term occupation (ibid.; Valk 2020a, 104). This raises the possibility that the fort was constructed hastily during the uprising in 1223, as has been identified for many strongholds across southern Estonia (see Lang & Valk 2011, 306–313; Valk 2020b, 377, fig. 169). Taking Lohu out of the equation, the field is clear for Varbola to dominate (see also Siig 2015, 73), as other forts, such as Keava, Padise and Kullamaa, are clearly smaller and might have functioned as ‘vassal’ or subordinate forts. Lohu, Keava and Padise had probably been local centres before Varbola, since there were smaller forts there in the Viking Age (see Tõnisson & Tamla 2008). Of these, Lohu and Padise were abandoned in the 11th century, and there were major changes at Keava as well (ibid.; Lang 2012b). These events roughly coincide with the emergence of Varbola, raising the possibility that other centres were subdued by Varbola.

The extent of Final Iron Age political structures and the sizes of stronghold hinterlands have been the subjects of long-standing discussion in Estonia. Some studies describe the political structures as local and small-scale (e.g. Tarvel 1983; Selart 2022, 9), suggesting that local pre-crusade nobility was only capable of inserting itself into low-level positions in the new nobility, holding fiefs of just a handful of villages (e.g. Johansen 1933, 738–741; Kaljusaar 2022). Others have suggested wider, sometimes even supra-regional polities and a hierarchy of centres, at least in the case of Otepää in southeastern Estonia, Viljandi in Sakala (Saccala) and Valjala in Saaremaa (Osilia) (Valk 2014; 2020a; Oad 2012; 2014; 2017; Mägi 2002).

Lang (2002, 149–152; 2012b, 217–218) shows that while there are groupings of *vakuses* (groupings of settlements) around Lohu and Keava, indicating the existence of fort districts, the lack of such groupings around Varbola suggests that it did not conform to the same pattern and was not a ‘common fort’ with a ‘typical hillfort district’. On the one hand, the ‘edge effect’ mentioned above introduces

the possibility that these groupings extended beyond the ‘edge’ and cannot therefore be observed from the LCD data. On the other hand, one could also speculate that the groupings were not something that emerged bottom-up around a fort, but rather a top-down tool for organising subordinate districts. A similar shift in interpretation has been suggested for the word *kihelkond* by Oad (2012; 2014), seeing them not as the result of villages and settlement areas voluntarily integrating in a bottom-up process, but rather as an addition to an existing political structure in a top-down way. Thus, we might imagine the hypothetical core domain of the Lodes organised differently, with fort districts arising in satellite or dependent areas, such as Lohu and Keava. However, neither hypothesis can be easily tested.

#### REASONS FOR THE EMERGENCE AND DECLINE OF VARBOLA

Although the notion of Varbola’s peripheral location has been questioned above, and no evidence suggests its rise was tied to strategic trade routes – rather, its characteristics align it more closely with other proposed power centres –, the question of why Varbola emerged where it did remains. From a deterministic standpoint of optimal location, one might expect the largest Final Iron Age centre in mainland Estonia to have formed near Rakvere in western Virumaa, an area with ancient settlements, highly fertile soils, and the largest concentration of ploughlands in northern Estonia (cf. Johansen 1933; Siig 2022). Nevertheless, Varbola did emerge in this somewhat unexceptional location. Thus, any explanation for Varbola’s emergence must account for non-deterministic factors, including specific historical conditions and human agency – factors that are difficult to clarify in the absence of written records. Still, an attempt will be made to sketch a possible scenario for Varbola’s rise and decline.

The factors leading to the emergence of Varbola are unclear. As Lang (2012) points out, Varbola’s origins differ from those of Lohu and Keava, where strongholds existed already in the Viking Age. Varbola emerged in an area without known prior forts, where the settlement itself might be relatively recent. In terms of the historical development of settlement, it has been suggested that coastal areas with thin rendzina soils that were easy to till with early agricultural technology were prominent in the Bronze Age and earlier periods of the Iron Age, while inland areas with heavier clayey soils gained importance somewhat later (e.g. Lang 2000, 285–287; Mandel 2003, 163–174). Considering that the region around Varbola belongs to the latter group, it may have developed through rapid internal colonisation at the end of the Iron Age. In Estonia, the 11th century in particular has been characterised by rapid settlement expansion into hitherto sparsely settled peripheral areas between older settlement regions. At the same time, in the core areas, most of the fertile lands were already occupied and therefore growth potential was already exhausted (Valk 2020b, 360–361). The region around Varbola seems to have been among those more dynamic areas. It might have been free from earlier power structures that existed in places with a longer

settlement tradition. This might have facilitated fast emergence of a dominating clan or family, which could have expanded its reach to nearby areas, subduing regions with existing centres. The exact site of Varbola, however, was probably chosen for its naturally defensible location on a promontory at the end of prominent ancient beach formations.

If Varbola was a major power centre in the 13th century, why did it lose its importance? Other notable Final Iron Age centres followed several trajectories, but a key factor in most cases seems to have been the influence of Hanseatic trade (Mägi 2020, 58–62). Tallinn and Tartu have been identified as trading centres already in the Iron Age (see Mägi 2018, 99–100, 276–280, 306–308, 380–381; Tvauri 2001), developing into the most important Hanseatic towns in Estonia due to their suitable trade locations in the Hanseatic age.

Viljandi was primarily a political centre in the Iron Age, but probably had some trade connections as well (see Valk 2014, 388; Mägi 2018, 104–105). In the Middle Ages, it became the centre of one of the most important commanderies of the Teutonic Order in Livonia and a small Hanseatic town.

Lihula, likely a harbour and trading hub in the Final Iron Age, was initially chosen as the episcopal see of the Bishop of Ösel–Wiek; however, the see was soon transferred elsewhere, and Lihula did not become a full-fledged town, remaining a second-tier centre (Pärn 2002, 368–369; Mandel 2002). One reason could be that, due to land uplift and ships with deeper draughts, the harbour at Lihula became increasingly unsuitable for Hanseatic trade (*ibid.*, 45; Mägi 2020, 61–62).

Otepää, the centre of southeastern Estonia up to the crusades, continued to be used as a stronghold post-crusades but was downgraded to a second-tier centre after Tartu. This seems to be partly connected to a reconfiguration of land-based trade routes between Tartu, Riga and Pskov, which had earlier passed through Otepää but began to bypass it (Mägi 2020, 58–60; cf. HCL XI, 7; Valk 2020b, 369, fig. 163; Raid 2005, 220, fig. 106). The stronghold was abandoned at the beginning of the 15th century (Mäesalu 2024) and Otepää declined into a local parish centre.

The stronghold of Valjala, likely the Final Iron Age centre of Saaremaa (see Mägi 2002, 216; Oad 2014, 249–250), was abandoned sometime in the late 13th or 14th century (Mägi 2020; Mägi et al. 2023; personal communication with Marika Mägi, September 2024). Although the area held onto some importance as the parish centre, the administrative centre of the island shifted to Kuressaare, which had a deeper harbour (Mägi 2002, 216–219).

Varbola belongs to a group that includes Äntu (Agelinde) and Soontagana, which eventually lost their importance entirely. While Äntu and Soontagana were abandoned soon after the crusades, around the mid-13th century, Varbola persisted and maybe even flourished into the 14th century. All three sites were located on the periphery of the political territories of mediaeval Livonia and might have been irrelevant for the new overlords. In addition, these sites were

situated inland, thus lacking access to maritime trade, much like Lihula and Valjala. They also did not lie at the crossings of major land and river routes, unlike Tartu and Viljandi, thus sharing the fate of Otepää. It seems that whereas in the Iron Age, strongholds could emerge in places far from trade networks, the post-crusade world favoured a configuration where political centres gravitated to trading towns.

The attempt by Helmoldus de Lodhe, member of the Lode family, to create new coastal towns called Lodenrodhe<sup>26</sup> and Cogkele<sup>27</sup> in 1296 (LUB III, 563) may reflect a recognition of these new realities. Varbola emerged during the 12th–13th centuries, an age of wars and power struggles, but was no longer fit for this new age of commerce. Could it be that Varbola was abandoned just as Helmoldus tried to integrate the family domain into the new Hanseatic world, but eventually to no avail?

## Conclusions

Based on the data and evidence presented in this article, the following claims can be made:

1. The location of the Varbola stronghold is not oddly peripheral as previously thought; it is at least ‘average’ in terms of centrality compared to peer sites in the historical provinces of Harjumaa and Läänemaa.
2. The border between the Duchy of Estonia and the Bishopric of Ösel–Wiek (which later became the border between Harjumaa and Läänemaa), where Varbola lies and which also coincides with the southwestern edge of coverage of the large Estonian list of the *Liber Census Daniae*, is not a sharp natural border between the two regions. A natural border zone would be expected 10–15 km to the west.
3. There is little evidence to support the idea that Varbola primarily functioned as a marketplace or trade centre.

Putting these findings in the context of previous archaeological and historical studies, as well as existing written sources, the following hypotheses were presented:

1. Varbola may have served as the power centre of the Lode family, an Estonian noble family controlling areas in both the historical Läänemaa and Harjumaa regions.
2. The border between Harjumaa and Läänemaa, known from late 13th-century sources, might not reflect prehistoric borders.
3. The perception of the border as a natural divide dating back to prehistory may have influenced archaeological research, reinforcing the perception of the area as a border zone.

26 Most probably in Harju-Madise parish, on the coast of the Bay of Paldiski.

27 Most probably Koila in Viru-Nigula parish, near the historical Mahu harbour.

These hypotheses should be tested through future studies in settlement archaeology and early medieval history. This is likely more promising in settlement archaeology, where new data are uncovered every year, but will probably prove more challenging in the field of history, where new written sources are unlikely to be found.

The current study emphasises the need for greater explicitness, reproducibility and epistemological transparency in landscape archaeological research. However, its methodology has limitations, such as an inability to model qualitative differences between archaeological sites and a lack of chronological perspective. To overcome these issues, more extensive fieldwork and better systematisation of existing information are needed. In the future, similar studies could also be conducted in other regions of Estonia to determine the functions of strongholds and uncover political configurations in pre-crusade Estonia.

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# *Varbola: ühe 11.–14. sajandi Loode-Eesti linnuse funktsioonist asukoha analüüsi ja kirjalike allikate põhjal*

Kristo Siig

## RESÜMEE

Loode-Eestis asuv Varbola linnus on Baltimaade suurimaid esiajaloolisi kindlustusi, mis tõuseb esile olulise keskusena ka varastes kirjalikes allikates. Selle asukoht on aga tekitanud senistes uurijates kummastust, kuna Varbola asuvat klassikalise võimukeskuse tekkimiseks liiga perifeersel alal. Teema on seotud diskussiooniga Eesti rauaaegsete linnuste funktsiooni üle, kus linnuseid nähakse kas pelgupaikade, võimukeskuste või kaubitsemiskohtadena.

Artikkel võtab tähelepanu alla Varbola väidetava „perifeersuse“. Eelnevad uurijad on pidanud Varbolat asustusest eemal asuvaks, kuid jätnud selgelt väljendamata, kuidas nad on selle järelaluseni jõudnud. Näiteks jääb ebaselgeks, millisel skaalal perifeersust ja kesksust hinnatakse, millise andmestiku põhjal seda väidetakse ning kas Varbola tõepoolest eristub selles osas teistest linnustest. Artiklis lahatakse Varbola asukohta läbipaistva, võrreldava ja korratava GIS-põhise meetodika alusel, kvantifitseerides muistset asustust erinevates (2, 5, 10 ja 20 km) raadiustes Loode-Eesti linnuste ümber. Sarnasel viisil on varem uuritud Virumaa linnuseid (Siig 2022).

Koos Varbolaga analüüsiti 17 ajaloolisel Harjumaal ja Läänemaal asunud linnust, mida on võimalik dateerida 11.–13. sajandisse ehk umbes Varbola kaasaega. Kõige parem andmeallikas muinasaja lõpu asustuse mudeldamisel on Taani hindamisraamatu suur Eestimaa nimistu, kuid selles artiklis ei olnud võimalik neid andmeid kasutada, kuivõrd need ei kata kogu uurimisala, vaid ainult Harjumaal osa. Selle asemel kasutati asendusväärtustena (ingl *proxy*) andmestikke viljakate muldade, arheoloogiliselt tuntud asulakohtade ja matmispaikade ning varauusaegsete mõisate kohta, sest need katavad laiemat ala. Kõikidel kasutatud asendusväärtustel on oma eelised ja puudused, ent kui neid kriitiliselt analüüsida ning kasutada mitut asendusväärtust n-ö trianguleerimiseks, siis need täiendavad üksteist. Kõigi andmestike ruumilist jaotuvust võrreldi ühe näidisala põhiselts Taani hindamisraamatu küladega ja leiti, et need andmestikud sobivad hästi asendusväärtusteks. Arvutustulemused iga andmestiku ja raadiuse kohta normaliseeriti skaalal 0 kuni 1, et luua kergesti võrreldavad indeksid.

Tulemused näitavad, et Varbola ei ole „perifeerne“, vaid pigem „keskmine“ või isegi üle keskmise „keskne“. Senised vastupidised arvamused võivad tuleneda Taani hindamisraamatu andmestiku tekitatud servaepektist. Servaepekt tähendab, et kui uuritakse kohtade ümbrust, siis uurimisala serva jäävad kohad saavad madalamaid väärtusi väljaspool uurimisala asuvate, ent selle servale lähedal olevate alade väljajätmise tõttu. Nähtavasti on varem eeldatud, et hindamisraamatu andmestiku läänepiir (mis langeb suuresti ühte vahemikus 1275–1285 üles tähendatud Saare-Lääne piiskopkonna ja Taani-aluse Põhja-Eesti piiri ning ajaloolise Harjumaa ja Läänemaa piiriga) kattub ühtlasi muinasaja lõpu maakondlike piiride ning ka Lääne- ja Põhja-Eesti vahelise loodusliku piirialaga, ja kui Varbola paikneb selle ääres, siis paikneb ta soisel äärealal. Lähemal vaatlusel selgub siiski, et looduslik, muinasajal asustamata soode vöönd nende kahe regiooni vahel asub pigem nimetatud ajaloolisest piirist 10–15 km lääne pool, mida kinnitab ka põlluharimiseks sobilike muldade ja arheoloogiamälestiste levik. Samuti viitavad mitmed 13. sajandi kirjalikud allikad sellele, et piir võis enne 13. sajandi keskpaika kulgeda teisiti ning hilisemad Kullamaa, Märjamaa ja võib-olla ka Vigala kihelkond kuulusid Harjumaale.

Uurimistulemused võimaldavad uuesti algatada diskussiooni Varbola funktsiooni ja rolli üle muinasaja lõpu asustushierarhias, kuivõrd linnuse võimukeskuseks pidamise peamine vastuargument on ära langenud. Seni on Varbolat peetud kaubitsemiskohaks, kuid tegelikult puuduvad selleks logistilised eeldused. Kirjalikud allikad toetavad pigem tõlgendust Varbolast kui võimukeskusest, sest Henriku Liivimaa kroonika järgi on varbolased iseseisvad poliitilised toimijad, kes sõlmivad lepinguid ning kellel on ka selge territoorium.

Ühe võtme Varbola mõistmiseks võiks anda seos Lodede suguvõsa valdustega, mis ümbritsevad Varbolat igast küljest. Kuivõrd viimatised uurimused viitavad Lodede kohalikule päritolule, on võimalik, et Varbola oli selle suguvõsa tugipunkt ja võimukeskus, mille tagamaa ulatus nii Harjumaale kui ka hilisemate Kullamaa ja Märjamaa kihelkondade alale.

Kokkuvõttes näitab uurimus meetodika ja eelduste selge sõnastamise olulisust, sest pelgalt visuaalsel vaatlusel põhinevad ruumianalüüsid võivad anda kallutatud tulemusi. Tulevikus võiks sarnaseid uuringuid teha ka teiste Eesti piirkondade kohta, et paremini mõista linnuste funktsioone ja toetada võimusuhte uurimist ristsõdade eelses Eestis.