

Trelleborg revisited

The context and distribution of artefact finds

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ABSTRACT

This study re-analyses artefact finds from the Viking Age ring fortress Trelleborg, Denmark, based on a digitisation and GIS mapping of the unpublished lists of finds and construction from the 1934-42 excavations. We assess the excavation's recovery strategy and we analyse the quality of the documentation in terms of the distribution and context of the artefacts. We show that a total of 3,267 artefacts were recorded from the excavations and that there is a clear under-representation of plain pottery, which suggests that many pottery sherds were discarded. Some iron artefacts are also likely to have been discarded. It is possible to link the majority of the finds to a feature or a find coordinate. The mapping shows that the vast majority of finds were found in pits or in the topsoil at the fortress site. The spatial distribution shows clear concentrations of finds related to textile work, antler working debris, and cooking vessels made of soapstone. We conclude that the finds reflect areas of activity at the ring fortress. However, there is no clear association between activities and specific buildings, which argues against artefacts being left behind in a sudden and unprepared destruction of the fortress.

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Introduction

In 1934-1942, archaeologists from the National Museum of Denmark led by Poul Nørlund excavated the circular earthwork Trelleborg near Slagelse in western Zealand. This was the first discovery of the large geometric ring forts, of which five examples are known today in present-day Denmark, as well as two probable parallels in southern Sweden (Roesdahl & Sindbæk 2014; Runge and Gamble 2021). The five Danish fortresses of this type were inscribed on the UNESCO World Heritage List in 2023 (Sindbæk 2024).

The discovery of the large and meticulously planned fortress from the late Viking Age was an archaeological sensation at the time and sparked a discussion about the social and cultural development of the Viking Age in southern Scandinavia that continues to this day. At the same time, the ring fortress was the first major Viking settlement of any kind to be excavated in Denmark. The size of the complex and the remarkable number of buildings – with 16 large hall buildings arranged

in four courtyards in the inner bailey and 15 similar buildings arranged radially in a semicircle in an outer bailey – has led some to consider Trelleborg to be a form of planned settlement of an urban nature, rather than just a fortress complex (Randsborg 1980, 99; Smith 2022, 123-124).

Poul Nørlund recognised that the large and varied object material from the excavation had considerable value as a reference for future archaeological finds. In his publication of the excavation in the monograph 'Trelleborg' (Nørlund 1948), he therefore made an exemplary effort for its time to present a large and representative selection of objects. Many finds were illustrated with photos and/or drawings, and their finds situation was summarised in the book's text and notes.

Since its publication, the artefacts from Trelleborg have been a valuable comparative corpus for research. This is due both to the fine presentation and the fact that the material is remarkably extensive and varied. However, the presentation was focused on the typological and chronological interest of the finds. No systematic attempt was made



to interpret the context of the finds in relation to the construction of the fortress. At the same time, it is clear from the presentation that the artefacts presented are only a selection – albeit a rich selection – of all the objects found in the fortress.

When Else Roesdahl published the artefacts from the ring fortress Fyrkat – Trelleborg's counterpart near Hobro in Jutland, which was excavated in 1950-1973 – in 1977, she used a detailed mapping of objects found in that fortress to demonstrate how certain groups of finds were concentrated in different parts of the fortress area (Roesdahl 1977, 176-184). The distribution had to reflect activity zones, and also showed that many objects were left where they had been used – in an archaeological primary context (Schiffer 2010, 34-35).

In the 1980s, Roesdahl's results inspired Leif Christian Nielsen to re-analyse selected parts of the Trelleborg artefact finds in a similar way. Nielsen produced a plan of the distribution of clench nails and clench plates based on the unpublished excavation records from Nørlund's excavations. The result and discussion were presented in a paper published after Nielsen's death (Nielsen 1990, 124). In his analysis, Nielsen also argued that the ring fortress had been struck by a major fire that had completely destroyed the buildings on the fortress site area and caused extensive damage to the timber-clad ramparts.

Today, the finds from Trelleborg remain a central reference for the material culture of the Viking Age. Among the many settlements from the period that have since been investigated in southern Scandinavia, the finds from Trelleborg are still remarkably rich and varied (Sindbæk 2008). The reason for this richness is not clear. From other excavated ring fortresses – Fyrkat, Nonnebakken and Borgring – no similar amount and variety of artefacts has been recovered, despite the intensive use of sieving (Roesdahl 1977; Roesdahl et al. 2014; Runge (ed.) 2024). The finds from the excavations at Aggersborg are numerous, but most of them apparently originate from a rural settlement that was on the site before the ring fortress was built (Roesdahl et al. 2014, 364).

Nielsen's theory about the Trelleborg fire offers a possible explanation as to why so many artefacts were left behind. If the fortress was

destroyed suddenly, one might expect that many items were left behind and perished in the fire. However, there are significant unknowns in this interpretation. It is not clear from Nielsen's published distribution map what was the basis for his mapping. Nielsen does not indicate whether the finds were made in a primary context or in contexts that can be assumed to represent redeposited material.

At the same time, the relative amounts of material types among the finds presented in Nørlund's publication indicate that selective collection and registration took place during the excavation. This is not mentioned in the published reports, which, as mentioned, only present a selection of the types of finds represented. What is striking, however, is the small number of pottery sherds presented. When compared with later excavations of Viking Age settlements, they suggest that only a selection of characteristic finds was recorded – in keeping with the typological interest that guided the excavations.

Tage E. Christiansen, who participated in most of the excavation at Trelleborg, recalled in 1984 that sieves had been used to harrow soil from pits, but that the topsoil above the fortress site was hardly ever examined in this way (Christiansen 1984, 84). He suspected that a large number of artefacts had been overlooked in the excavation, that the quality of the contextual information was deficient, and that the inventory from Trelleborg had to be judged on the basis of inferior data quality than, for example, the finds from Fyrkat.

Today, it is not possible to determine from the existing presentations and studies which processes Trelleborg's artefact finds reflect, or to what extent the finds were collected in a way that allows for an analysis of context and distribution. To investigate these questions, in this study we have digitised and reprocessed the original, unpublished finds lists from the excavation. Here we report the first comprehensive digital database and spatial mapping of Trelleborg's artefact finds and discuss our findings. The digital database is available at:

<https://doi.org/10.5281/zenodo.14716529>

The study focuses on the following questions:

- Can information in the finds lists help to determine what recovery strategy was

practised during the excavations at Trelleborg in 1934-42?

- To what extent does the information in the finds list enable an understanding of the context of finds and a mapping of the distribution of artefacts?
- To what extent does the distribution of artefact finds at Trelleborg indicate if the finds were left in primary contexts or are redeposited objects?
- Could the distribution of artefact finds indicate areas of activity at the ring fortress, similar to the patterns found at Fyrkat?
- Can the context of the artefacts support or refute the theory of a sudden destruction of the fortress by fire?

In the following, we first explain the study's material and methodology, then present and discuss observations about the distribution and context of the artefacts, before finally concluding on the study's main questions.

Materials and methodology

The report materials from the excavation of Trelleborg are stored in the National Museum's report archive registered under NM I J.nr. 299/53. The artefact finds were originally registered on index cards. Finds were registered with a consecutive number preceded by a capital 'Q', e.g. Q1238.

Where there were multiple artefacts from the same context/excavation unit, they were identified with the same number. In addition, a small proportion of finds are also differentiated by a letter at the end of their Q number (such as Q 999a, Q 999b and two artefacts numbered Q 999c) to separate finds of the same type in the same context (for example two bone pins) from each other for use in the plates in Nørlund's 1948 publication. Although these letters for this separation are listed in the 'List of preserved finds', they are not written on the index cards or the objects themselves. We have noted them, however, in our work for precise identification.

This registration excluded some object groups; unprocessed animal bones that had been transferred to the Zoological Museum; human bones transferred to the collection of what is today the

Panum Institute of the University of Copenhagen; finds from the pits from Stone Age and Iron Age settlements that were handed over to the National Museum's then First Department (Danish Antiquities); and finally a coin find that had been transferred to the Royal Danish Collection of Coins and Medals.

In 1948, the index cards were rewritten by T.E. Christiansen in the list 'Trelleborg-kartoteket'. In some cases, a new determination or description of the finds was made, especially some iron objects were better identified. Christiansen notes in his preface to the list that 'In Dr Nørlund's review of the finds, numerous items have been discarded' (our translation). This tells us that more artefacts were initially collected during the excavation than are currently registered. In 1953, a 'List of preserved finds' was rewritten in connection with the material's final accession at the National Museum's First Department. Along with these lists is an 'Overview of the find sites', i.e. units associated with a measured point or a feature, such as a pit. The numbers of the pits are identified with a capital 'G' to distinguish them from the artefact numbers.

Today, all lists and index cards are stored in the National Museum's archive, section for Danish Antiquity, separated so that materials specifically about the Viking Age fortress are stored in the 'Iron Age settlements' archive, while lists of finds and structures are stored under 'Stone Age settlements' in accordance with the practice that cases are registered under the earliest period represented among the finds.

The preparatory work for this study included digitising and rewriting the lists related to the Trelleborg excavations, which has enabled efficient searches for objects and find locations and forms the basis for further work on compiling a more complete list of objects. We cross-referenced the 'Trelleborg catalogue' from 1948 with the 'List of preserved finds' from 1953 and found only six differences between the two, none of which were significant for further work. Therefore, we have chosen to digitise the 'List of preserved finds', as it was made most recently, is easier to read, and represents the more complete work of Nørlund and his colleagues. We have also digitised the 'Overview of find sites', which contains a large



Figure 1. Detail of a draft plan of the Trelleborg excavation with a point marked by a cross and circle in the region of the rampart. This is the zero point and baseline for the main measurement system used in the excavation. The point is placed between the east and south gateway. North is to the right (Plan: The National Museum of Denmark, Topographical Archive. Photo: S. Sindbæk).

amount of handwritten underlining, notes, and later additions, parts of which are unfortunately unclear and difficult to read. In order to make the information from these lists available in a format that could be implemented in GIS programmes and for statistical analyses, the two lists were also edited into a single table. During this summarisation, we took into account that several Q-numbers are not associated with a preserved object in the list of preserved objects but are only mentioned in the overview of find locations. In addition, teeth and bones from e.g. the burial ground have their own Q-numbers and are listed in the list of find locations, but do not appear among ‘preserved artefacts’ because, as mentioned earlier, they have been separated out to other collections. In this way, a knife, nails or other artefacts would be listed in one list, while teeth and bones from the same grave would only be in the other. The now summarised list includes all of

these items, allowing for a more accurate picture of the distribution of finds and more correct analyses of the number of items and the amount of different materials from Trelleborg.

Excavation measurement system

To get an overview of the findings from Trelleborg, we created a digital map of the site by georeferencing Nørlund’s various plans according to modern maps and the Danish Elevation Model (DK-DEM, hosted by the Agency for Climate Data) based on LIDAR scans. This could be done with very high accuracy due to the many concrete posts that were placed to mark out the excavated features at Trelleborg, and which could also be identified on the elevation model and thus be used to position the plans. We could then begin to plot the known pits as polygons and mark the many finds

as points on the map based on their Q-numbers and known find locations. The ETRS89/UTM-zone 32N (EPSG:25832) coordinate system was used throughout this part of the project.

In the list ‘Overview of find locations’, some finds are described using two numbers separated by a hyphen or written as fractions. These numbers refer to a coordinate system whose datum, axes or units of measurement were not described in the publication or the available reporting materials. From coordinates related to identifiable buildings, the approximate location and orientation of the system could be estimated. Among the archived materials was an incomplete working plan of the fortress, which indicated a line starting from a point on the south-eastern part of the rampart, marked by a cross in a circle (Figure 1). This turned out to be the baseline for the Q-list coordinates.

On the baseline, two points were marked ‘100’ and ‘130’ respectively, and with a digital grid and measuring tool overlaid on the georeferencing of Nørlund’s map and the LIDAR map, we confirmed that they were 100 m and 130 m respectively from the system’s zero point with less than one metre inaccuracy. It was also possible to confirm the baseline as the y-axis in the coordinate system from two postholes whose coordinates were given and which could also be identified independently of the coordinates, simply from their description. In this way, we can estimate that the finds are correctly located to within one metre, but in some cases, there may be doubts about more precise locations.

The previously mentioned summarised list of all pits and finds could then be supplemented with their coordinates by extracting their geographical location from QGIS in a table in which each find had x and y coordinates listed and adding this information to our table. The list of all artefacts and find locations also contains each item’s Q number, material, type, its description from Nørlund’s lists, year of excavation, date, and any pit the item was found in. In addition, each item in the list is equipped with a unique seven-digit number that we have added to differentiate them. The list can be implemented in a GIS programme and the objects displayed on a map according to their respective coordinates with all relevant data about the object attached.



Figure 2. The reconstructed basis for the measurement system in the western gate. North is up (Graphics: M. Larsen).

Measurement system for the gates

During the excavation of Trelleborg, local measurement systems were created to record the position of finds made in the site’s four gates. The system is based on postholes in the inner mouths of each gate, where postholes from the inner side of the rampart cross postholes from a planked road along the inner face of the rampart (Figure 2). Taking the western gate as an example, there is a series of 15 so-called ‘centre holes’ within the gate from the plank road in the longitudinal direction. These are labelled 1c to 15c (‘c’ for ‘centre’) and are counted from the inside of the fortress towards the outside, so in this case from east to west. Parallel to the row of centre holes are two rows of post holes belonging to the gate structure itself, directly adjacent to the rampart on the northern side of the centre holes and on the southern side of the centre holes respectively. Both of these rows consist of 32 posts, which, like the centre row, are numbered consecutively from the inside of the rampart to the outside, and again from east to west. They are called 1n to 32n (north side) and 1s to 32s (south side) respectively. This means that post holes 1n, 1c and 1s are aligned with each other across the length of the gate. The gate also has a measuring point called Vp (‘West Gate’, just as the ‘East Gate’ has an ‘Øp’), which is the zero point of a

measuring line that follows the longitudinal axis of the gate. This Vp is located in a post hole in the centre of the plank road, in the same way as the centre holes in the gate and is crossed by an imaginary line made by the holes of the planks that supported the rampart from the inside. This measuring point Vp is 1.3m east of 1c.

This system of measuring the gates has enabled an efficient and precise registration of the find locations, which, especially in the case of the west gate, are often described in terms of their proximity to the post holes and measuring point Vp. Some objects are recorded as found directly in postholes, others between two neighbouring postholes, and still others by first measuring along the length of the gate from Vp and then a short distance to the north or south of this measurement line. This system forms the basis for our digital registration of the finds relevant to the gates, which is why most of these, especially in the west gate, can be considered quite accurate. However, the system has not been used to the same extent during the excavations to record the finds in the east gate, north gate and south gate. The locations of some artefacts are described using the system's measuring points and numbering of postholes, but most find locations in these three gates are more vaguely described, such as 'F[ound] in the east side near the south end'. This should be kept in mind if one wants to investigate specific finds in these areas of the Trelleborg site.

Trelleborg's pits

During the excavations, around 220 pits and cuttings were found, of which Nørlund estimated the majority (125) to be from the Stone Age, almost half as many (approx. 45) from the Viking Age, a few (10) from the Iron Age, and the remaining are undated. These are numbered consecutively with only a few deviations; there is both a 64A (Stone Age, excavated in 1936) and a 64B (Viking Age, excavated in 1937). In addition, during the excavation, three mix-ups apparently occurred, which must have been discovered after the excavation itself, as these double occurrences were noted by hand in the 'Overview of find locations'. These are pits 31 and 184, pits 84 and 148, and

pits 116 and 143 respectively. In the list of pits in the 'Overview of Find Locations', the depth, date, year of excavation and a few small comments are also listed, but these are not consistent. The year of excavation and date can be read elsewhere in the overview, but not all pit depths are noted, and from pit 138 onwards, depth is no longer noted at all.

We have digitally recorded the locations of the pits by cross-referencing two plans of Trelleborg in the publication, one of which has the pits marked in red, blue and uncoloured (Stone Age, Pre-Roman Iron Age and Viking Age respectively) and their numbers indicated, while the other is larger, of a higher resolution, and is easier to identify fixed points from. 'Overview of Find Locations' describes the locations of several pits that are not shown on the plans, but which we have added to our map based on the available information. We have given these a near-square shape, so they are visibly different from the vast majority of the pits, and their locations should not be considered nearly as precisely indicated as the rest, which on the other hand, due to Nørlund's map, must be considered to be drawn with a high degree of accuracy.

For use in our overall digital mapping of the spread of the finds, we also had to indicate the locations of the pits as points instead of their actual outline. These points indicate exactly the centre of each pit, which is why the searched objects or Q-numbers associated with them will also be shown as located directly in the centre of their pits. Since Nørlund has not indicated exactly where in the pits the individual finds were made, it would not be possible to place them with higher accuracy than this. On the other hand, it is easier to differentiate between finds from two neighbouring pits by eye.

Uncertain locations, vague descriptions, and confusing pits/objects

During further work with Nørlund's lists of artefacts and find locations, we have been aware of a number of factors that – depending on what we are investigating in a given case – can give different results. Many find locations can be determined

with a high degree of precision, such as through the coordinate system and the system used in the western gate in particular, or when talking about finds in easily identifiable post holes, such as in the corners and gable rooms of the houses. Others, however, are only vaguely described, as previously mentioned, and our interpretation of the location can therefore not be as certain as for other find locations. In a few other cases, it is difficult to fully understand what Nørlund meant in his description, and our guess at such locations must therefore necessarily be an interpretation based on neighbouring finds, the order of objects in the list, and the given context. In addition, some artefacts have been found in e.g. spoil heaps, which is why their locations must also be considered approximate. On the whole, these inaccuracies are not a problem when studying the general distribution of types of artefacts in overview but must be taken into account when studying individual artefacts where, in addition to information about the object itself, one should take note of the description of the find location.

During the excavation, there have also been mix-ups and the like with a small number of artefacts, as with the pits (*cf.* above). We have taken this into account by including all such ‘alternative’ numbers and noting the counterpart for each instance, whereby a misunderstanding should be cleared up immediately. Again, this is not something that will have a significant impact on analyses of the items themselves or their distribution.

Results

The artefact assemblage

Poul Nørlund’s presentation of the artefacts found at Trelleborg in the monograph from 1948 is, as described, intended as a presentation of the types found at the fortress in order to determine the date of the site and characterise the activities that took place at the fortress. For common find groups such as ceramics, it is not possible to determine from the book’s presentations how many objects were found or recovered. It is also difficult to get an overview of the contexts in which the finds were made.

Type	Instances of finds	Number of artefacts
Ceramics	307	921
Nails	241	567
Various	267	512
Production waste	71	170
Whetstones	100	100
Beads	14	78
Pins	56	56
Loom weights	32	69
Knives	68	68
Arrowheads	65	65
Soapstone shards	34	59
Combs	32	50
Various tools	46	49
Buckles and brooches	46	48
Fittings	38	42
Spindle whorl	40	40
Slag	12	39
Locks	11	33
Bucket staves	3	30
Keys	27	29
Handles	21	21
Hooks	18	18
Rings	14	16
Scissors	12	14
Axes	10	10
Horseshoes	9	9
Ice skates	8	8
Samples	8	8
Stone blocks	7	7
Teeth	86	7+
Grinding stones	6	6
Bowls	6	6
Shield bosses	5	6
Hinges	5	5
Equestrian Equipment	5	5
Spurs	5	5
Weights	5	5
Clubs	5	5
Chains	3	4
Fossil sea urchins	4	4
Hammers	4	4
Planks	7	4+
Gaming pieces	2	4
Brackets	4	4
Skulls	4	1+

Table 1. Number of finds by object type.

Type	Instances of finds	Number of artefacts
Wedges	3	3
Disks	3	3
Lime blocks	1	3
Drills	3	3
Lances	2	2
Weighing scales	2	2
Shoe or purse	1	2
Chisels	2	2
Anvils	2	2
Hooks	2	2
Ingots	2	2
Bells	2	2
Belemnite	1	2
Vessels	2	2
Spades	2	2
Sheet metal	1	1
Rope	1	1
Cramp	1	1
Runner	1	1
Bucket lid	1	1
Clamp	1	1
Strike-a-light	1	1
Drawknife	1	1
Tube	1	1
Plate	1	1
Pincers	1	1
Brace	1	1
Fork	1	1
Strapend	1	1
Brick	1	1
Rock	1	1
Pot	1	1
Pliers	1	1
Crucible	1	1
Weight	1	1
Felt	1	1
Roofing tile	1	1
Snail shell	1	1

Table 1 continued. Number of finds by object type.

From the digitised finds lists, an overview of the most common object types (Table 1) and material types (Table 2) can be compiled. The total number of artefacts recorded in the finds lists is 3267. As already mentioned, to this should be

Material	Instances of finds	Number of artefacts
Iron	831	1292
Burnt clay	387	1161
Rock	189	218
Skeleton	111	>1
Bone	110	154
Antler	69	163
Wood	64	87
Bronze	54	73
Glass	10	62
Lead	5	5
Fossil	5	6
Amber	4	4
Gold	2	6
Unknown	2	2
Horn	1	10
Leather	1	2
Silver	1	2
Soil	1	1
Lime	1	1
Seaweed	1	1
Charcoal	1	1

Table 2. Number of finds by material.

added artefacts from the Stone Age and Iron Age, which were separated out as special collections after the excavation.

The Trelleborg assemblage is notably rich in several common find types. This applies, for example, to sherds of soapstone pots (59 pieces), whetstones (100 pieces), spindle whorls (40 pieces) and fragments of loom-weights (69 pieces). With the exception of the finds from Aggersborg, where there is a very large amount of artefact material from the rural settlement that existed on the site before the construction of the ring fortress, and Fyrkat, where an unusually intensive collection including very small fragments of soapstone and whetstones was carried out during the excavation of the ring fortress, the Trelleborg finds are among the largest known Viking Age inventories in modern Denmark.

However, the tables also show that the distribution of finds from Trelleborg is striking in several respects compared to other published Viking Age

	Ceramics	Soapstone	Whet-stones	Loom-weights	Spindle whorls	Combs	Beads	
Trelleborg	921	59	100	69	40	50	78	
Trabjerg	3415	26	27	40	10	0	3	Bender Jørgensen & Eriksen 1995
Fyrkat	304	172	238	15	12	0	9	Roesdahl 1977
Aggersborg	29500	277	153	94	128	30	23	Roesdahl et al. 2014
Sebbersund	23000	72	63	-	79	-	23	Birkedahl 2000
Ribe Post-hustorvet	19340	202	308	734	32	124	3843	Sindbæk (ed.) 2023
Ystad	1879	7	0	150	23	15	16	Strömberg 1978; 1981
Schuby	14814	8	40	227	53	0	48	Meier 2007
Gårdstånga	3167	9	28	10	11	>2	-	Söderberg & Sten 1994
Selsø Vest	3200	10	24	>100	25	8	16	Sørensen & Ulriksen 1995
Vester Egesborg	13500	>50	104	130	75	63	93	Ulriksen 2018

Table 3. Comparison of frequent artefact groups at Trelleborg and other Viking Age settlement finds.

settlement finds in Denmark (Table 3). In comparison, the number of pottery sherds among the preserved finds is relatively modest (921 pieces). At several sites with comparable finds inventories, more than ten times as much pottery has been recorded. It is also striking that no less than 338 pieces of Trelleborg pottery are rim sherds – more than a third of all pottery finds. This distribution most likely shows that the collection of pottery was highly selective.

In comparable inventories where everything has been collected, the proportion of rim sherds is, for example, 15% of the Viking Age pottery at Aggersborg and 9% of the local Viking Age pottery from Ribe/Posthustorvet (Madsen and Sindbæk 2014, 214-217; Knudsen 2023, 34). If we assume that the material at Trelleborg was similar in kind, then a total inventory of around 2,000-3,500 sherds would be needed to match the preserved number of rim sherds. It is therefore likely that the preserved finds represent less than a third of what was found.

To assess the background to the quantity and composition of Trelleborg's artefact inventory, we can compare the distribution of the most common find types in different types of context (Table 4). A large group of artefacts originate from the four gates whose floor layers were covered by the collapse of the gates. As in the pits, these were particularly well-preserved find contexts. Many artefacts have been found in the west gate of the fortress in particular. They include a large number of loom-weight fragments and production waste from antler. The excavation revealed that the west gate had been closed off to the west at some point, after which the gate room was apparently used as a living space or workshop. The many finds here are therefore linked to a specific context and activity that probably does not reflect the primary phase of use of the fortress.

Another special find context is the burial ground, which accounts for a large number of finds of nails from coffins. In addition, almost all of the excavation's finds of glass beads have come

Type	Topsoil		Pits		Cemetery		Gates	
	Units	Finds	Units	Finds	Units	Finds	Units	Finds
Whetstones	35	35	29	29	9	9	16	16
Combs	5	10	12	17	1	1	13	18
Ceramics	164	407	96	337	1	1	40	164
Soapstone	17	38	12	15	0	0	3	3
Nails	106	201	40	131	40	162	30	39
Beads	2	2	0	0	10	71	0	0
Spindle whorls	19	19	16	16	0	0	4	4
Loomweight	10	11	5	7	0	0	16	48
Others		537		403		114		164
Total		1260		955		358		456

Table 4. Comparison of frequent artefact groups at Trelleborg ring fortress by type of find context.

from the graves. A third large group of finds were made in pits and other large cuttings. The amount of finds in these features reflects the fact that soil from the pits was systematically sieved, unlike soil from the topsoil at the fortress site.

In total, 955 artefacts are registered as finds from pits, while 1260 artefacts are attributed to the fortress site area. In total, two-thirds of the inventory from Trelleborg was found in something resembling a typical situation for settlement finds, i.e. in association with the buildings' postholes, hearths or the topsoil of the fortress site.

If we compare the finds from the pits with the artefacts recovered from the fortress site, they show a very similar distribution of materials and types. For both groups, the composition of materials and artefact types is similar to the pattern of the composition of more common settlement finds (see Table 3). This suggests that both the finds from the pits and from the fortress site area reflect the same activities, and thus that the spatial distribution of these artefacts may reflect activities at the fortress.

Spatial distribution of artefacts

If we first look at the distribution of the most common material groups – iron, ceramics, wood – we can get an overall impression of the preservation and excavation situation (Figure 3). The distribution shows that very few finds have been registered in the outer bailey. This is also noted by Nørlund (1948, 29), who argues that the pattern does

not reflect a generally lower intensity of investigation but may be due to a lower level of activity or more short-term use of the settlement in the outer bailey. Within the inner bailey, the distribution of finds is relatively dense across all areas with the exception of the outer part of the south-west quadrant. Here, observation conditions were difficult as the fortress was built on fill layers. The excavations here were not as intensive, and a large part of this quadrant was not excavated right up to the rampart.

With the exception of the south-west quadrant, there is a tendency for more artefacts to be found in the areas closest to the rampart compared to the inner parts of the fortress site area. The documentation does not mention anything about this, but it is likely that this is at least partly due to the fact that the areas near the rampart were covered by thick layers of soil that had slipped out from the rampart, and that the previous surface layers were therefore partially intact.

Numerous finds of wood have been made in the moat, but otherwise only in a single well. Iron artefacts, especially nails and rivets, have been found more or less throughout the fortress area, and also in large numbers in the burial ground east of the fortress. Ceramics are also evenly scattered within the ring fortress but are rarely found in the burial site. There are a few large collections of pottery from the ring fortress. Most come from pits, or in places where finds from a larger area are gathered under one number. This is the case in the north gate, for example, where all finds are recorded in one collection, as opposed to, for example, the east and west gates, where most finds

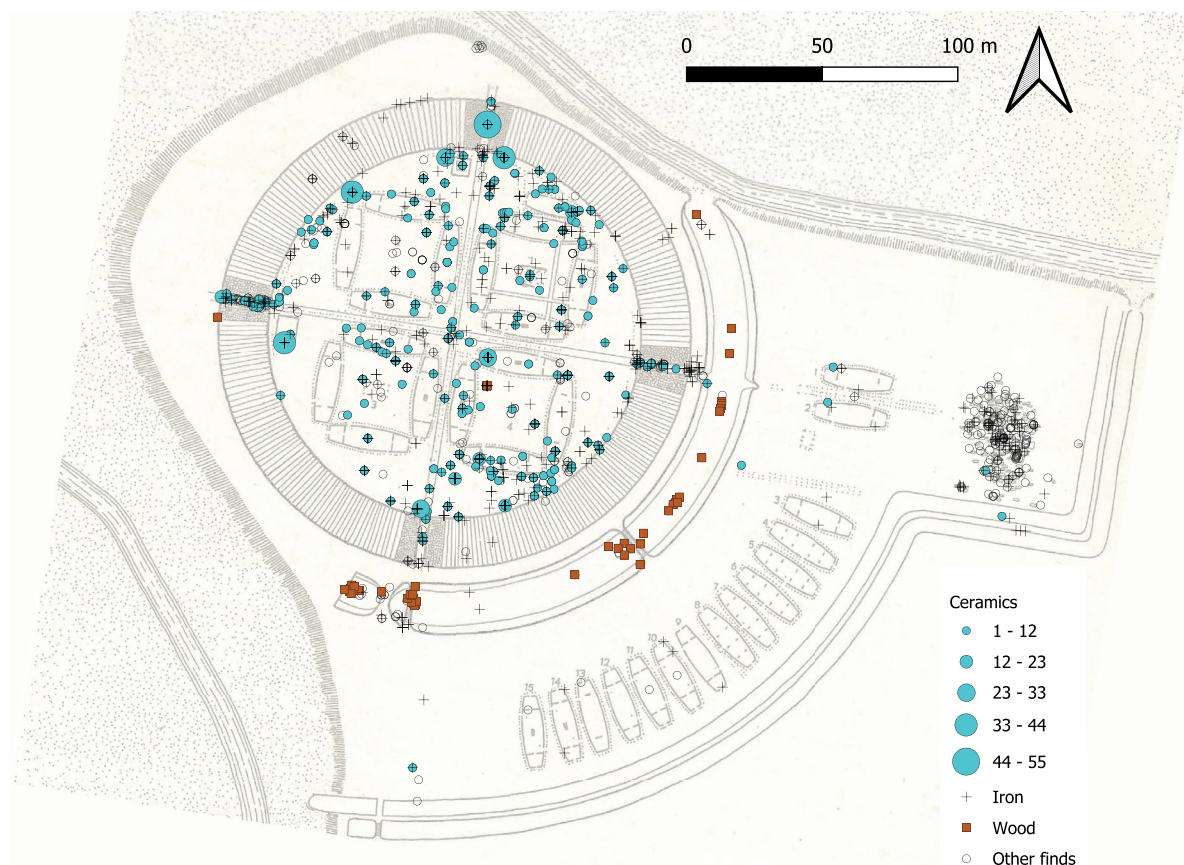


Figure 3. The distribution of artefacts found at Trelleborg divided into iron, ceramics, wood and other materials (Graphics: M. Larsen).

are recorded and measured individually. A special context is the ‘Four-jar Find’ Q1238, which was uncovered near the rampart east of the north gate. Here, four whole jars and sherds of several others were found together in a small area, possibly in a trench that lay right up against the inside of the rampart (Nørlund 1948 p. 16).

Looking at specific artefact types, some of them show a limited distribution pattern. Glass beads are, with two exceptions, only found at the burial site (Figure 4). Iron nails are also highly concentrated in the burial site, where they were used in coffins, but are also evenly distributed throughout the fortress area.

The relatively few finds of craft-related artefacts show no clear focus in most cases (Figure 5). An exception is the production waste of antler from combmaking, which is clearly concentrated in two areas: in the west gate and the fortress site area just north of it, and on the outer parts of the south-east quadrant of the fortress.

Textile crafts are represented by spindle whorls, which are found evenly in all four quadrants and in several gates (Figure 6). On the other hand, the distribution of loom-weights shows a clear association with the same areas as the antler-working debris, i.e. in and around the west gate and on the outer parts of the south-east quadrant. In the latter area, there are also relatively many finds of scissors and needles, which at least in some cases are linked to textile production. These distributions may suggest that weaving and other textile work was concentrated in one or more buildings in the south-east quadrant of the fortress. It cannot be clearly documented in other buildings, with the exception of spinning, which was a mobile activity.

As mentioned, the many craft-related finds from the west gate are linked to a phase when this gate was closed and used secondarily as a dwelling or workshop. This probably took place in a late or secondary phase of use, and therefore hardly reflects activities in the primary use phase of the fortress.

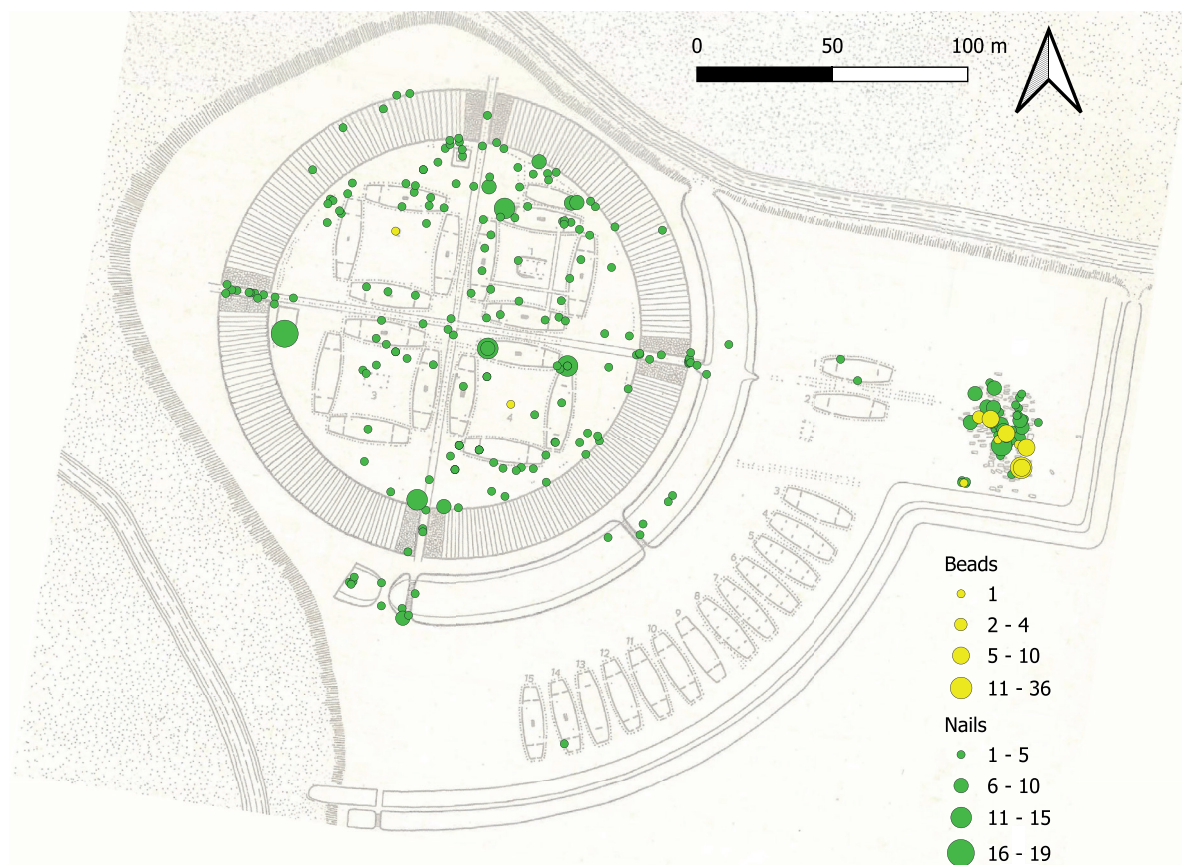


Figure 4. The distribution of glass beads and iron nails at Trelleborg (Graphics: M. Larsen).

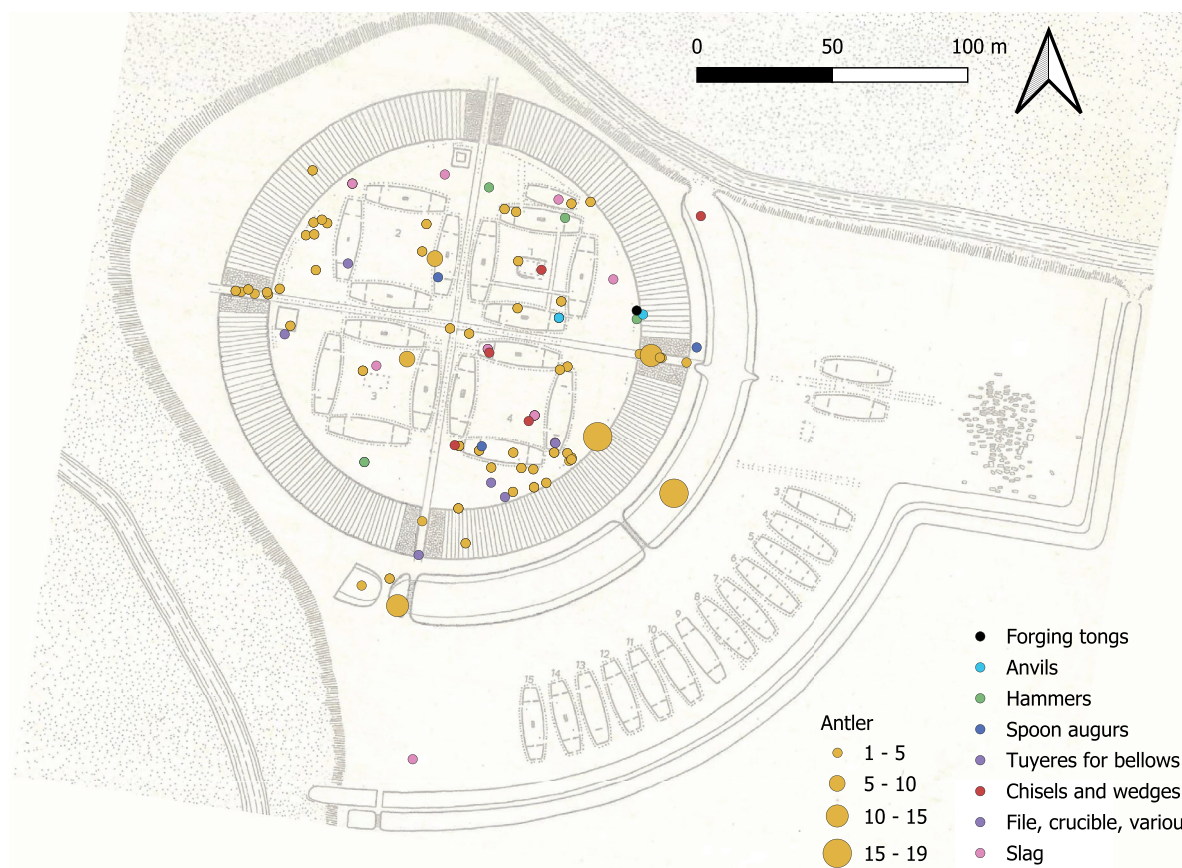


Figure 5. The distribution of artefacts related to forging, antler-working, and other crafts at Trelleborg (Graphics: M. Larsen).

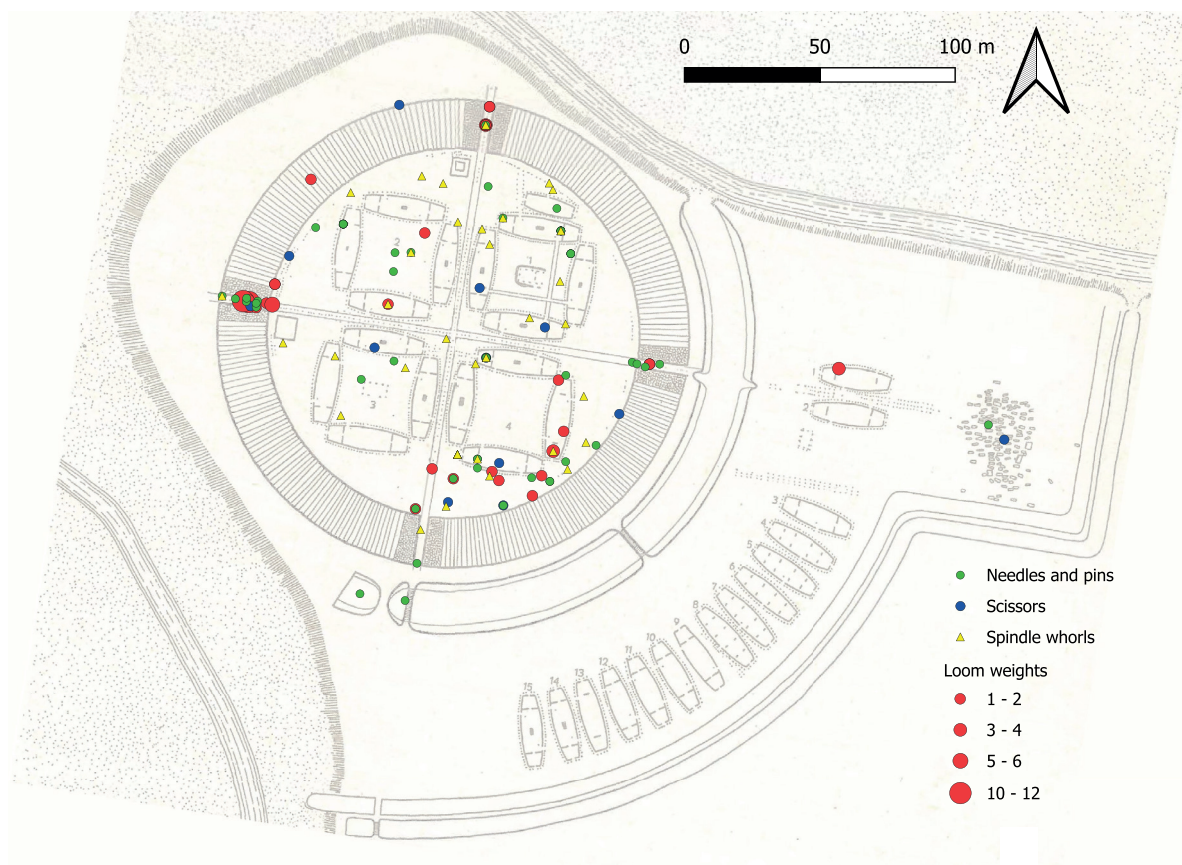


Figure 6. The distribution of textile craft artefacts at Trelleborg (Graphics: M. Larsen).

A markedly different distribution of finds is shown by sherds from soapstone vessels (Figure 7). They are mainly found in the area inside the north gate of the fortress and in and around the westernmost house in the south-east quadrant. On the other hand, almost no soapstone has been found among the finds in the west gate or other areas with concentrations of craft-related finds. At Fyrkat, concentrations of soapstone sherds have been interpreted as traces of kitchen activities. The distribution of finds at Trelleborg makes a similar interpretation plausible here.

As mentioned, there is a tendency for artefact finds from the fortress site area to be concentrated in the better-preserved areas near the ramparts. Unsurprisingly, it is therefore also in these areas that we see the clearest indications of activity areas. In the inner parts of the fortress site area, the preservation is poorer, and the possibility of identifying activities is therefore slighter. This is a factor to bear in mind when assessing the overall picture of the distribution.

Discussion

The digitisation and systematic analysis of object lists and find information in the archive for the excavations at Trelleborg 1934-1942 has initially provided a clearer insight into the excavation technique and collection strategy practiced during the fieldwork. Despite earlier scepticism, we can see that the data from Trelleborg is comparable in number to the Fyrkat finds in many categories.

This is true even if we only look at the third of the material that is registered as finds from the fortress site. In other words, we have relatively precise find information on a large amount of artefacts. Based on the distribution of types and materials, we can also estimate that the collection of pottery has been highly selective, with an under-representation of undecorated body sherds. It is likely that there was a similar sorting of some other artefact groups, such as nails and rivets. For most other artefact groups, however, the relative frequency is not striking in comparison to other excavated settlements, which makes it likely that a full collection and registration of finds was attempted.

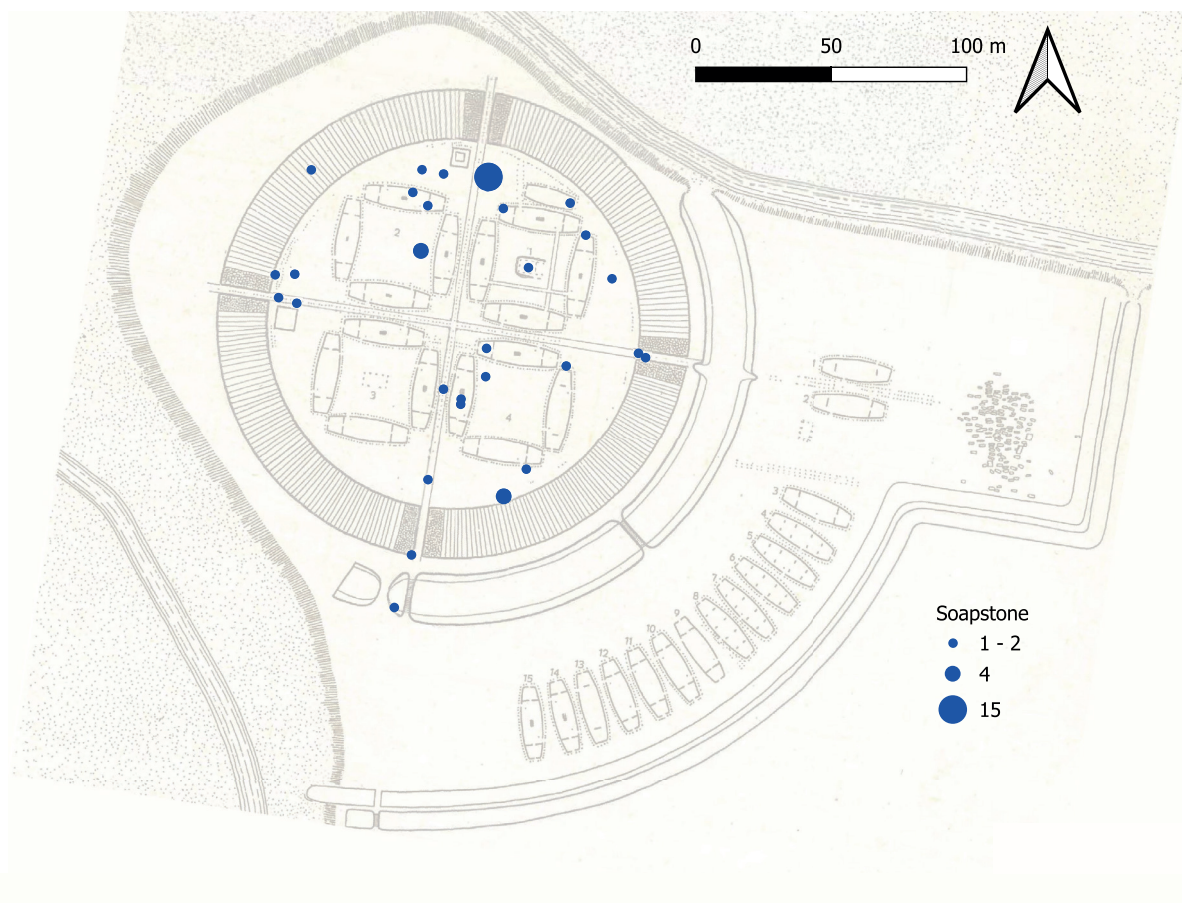


Figure 7. The distribution of soapstone shards at Trelleborg (Graphics: M. Larsen).

It proved possible to decode the information in the lists of artefacts and find conditions in the report material so that it was possible to determine the location of the vast majority of artefact finds with reasonable accuracy based on the reconstructed measurement systems: either as linked to a specific pit or other feature, or in relation to coordinates whose position can be determined with an accuracy of approximately one metre. This makes it possible to use the data to carry out an overall mapping of the distribution of artefact finds.

Based on the mapping, it is possible to show that the finds are scattered throughout the excavated area within the ramparts. The vast majority of finds were found in pits or in the topsoil of the fortress site area, while some were found concentrated in the fortress gates. In contrast, there is only a very limited amount of finds in the outer bailey area and in the burial ground, apart from the finds in the graves themselves. This suggests that the distribution of artefacts generally reflects a spatial distribution of activities in the fortress.

Within the ring fortress itself, there are clear concentrations of finds related to specific activities. This applies to craft activities such as textile work and the processing of antler, which occur mainly in the outer parts of the south-eastern block of the fortress and west of the north-western block. On the other hand, the discovery of many sherds of vessels made of soapstone in the northernmost part of the fortress can be linked to cooking. We can therefore conclude that the distribution of artefact finds at Trelleborg, as at Fyrkat, shows patterns that reflect specific areas of activity.

However, there is no clear link between activities and specific buildings. Combined with the fact that many artefacts originate from pits and other cut features, this suggests that the artefacts at Trelleborg were generally found in the spaces where they were used and lost. Artefacts found in the pits were most likely deliberately abandoned, probably disposed of as rubbish.

The finds from the topsoil of the fortress site must, in principle, be regarded as redeposited material that may have been moved spatially within the fortress area by later agricultural work.

According to the documentation, this applies to approximately half of all finds. For example, among 69 units with finds of antler 22 are related to an excavated feature with a G-number; twelve units are found in the gates and must also be from intact deposits; one find is specifically described as being found at a hearth, while the situation of 33 units is not recorded, probably indicating finds from the topsoil. Similarly, among the 32 units with finds of soapstone, twelve are related to features with a G-number, three are from the gates, while the situation for the remaining 13 is unknown. It might be tempting to exclude the 'topsoil' finds from analysis, were it not for the fact that the excavators clearly regarded most of them as related to the excavated features. Many items were found in areas covered by fill from the rampart, and were thus not affected by ploughing in the modern period. The fill removed as topsoil elsewhere in the fortress also included undisturbed deposits, as indicated by the presence of features such as stone hearths. However, in the absence of a systematic recording of depth, we cannot estimate how widely this applies to the finds. However, items like antler waste would usually not survive for long in the topsoil. It is likely, for this reason, that many of the 'topsoil' finds relate in fact to intact deposits.

The distribution also argues against the many artefact finds reflecting a sudden and unprepared destruction of the fortress. If that were the case, we might have expected a larger proportion of finds to be left within the traces of buildings. However, it is certain that at least some of the finds belong to a phase in which the primary organisation of the fortress changed. This is clearly the case for the items found in the fortress gates, especially the east and west gates, which were blocked and used as living quarters and workshops late in the life of the fortress. Unlike the finds from the fortress site area, it is likely that at least some of the gate finds can be considered to have been recorded in a primary context.

Some of the craft-related finds from the fortress site area are similar in character to the finds from the gates and may therefore possibly be linked to the same late phase of use. However, it should also be pointed out that no systematic difference has been observed in the composition of finds from the gates, the fortress site area, and the

fortress pits and wells. It is unlikely that all or most of these finds originate from the late utilisation phase. They reflect at least as much the primary functional period of the fortress.

Conclusion

The digitisation and GIS mapping of the unpublished lists of finds and construction from the excavations at Trelleborg has made it possible to reassess the artefacts from the excavations. The review shows that a total of 3,267 artefacts are registered from the excavations. When comparing the range of types and materials, it can be seen that there is a clear under-representation of plain pottery. This makes it likely that many sherds have been discarded. It is likely that some iron artefacts were also discarded.

We can conclude that the area within the ring fortress – but not the outer fortress – was generally relatively rich in artefacts. This probably reflects both a relatively intensive activity and an excavation method that provided intensive opportunities for retrieval compared to many excavations today, as all soil preparation was done by hand rather than by excavator.

With the exception of the selective collection of uncharacteristic pottery sherds and possibly some iron objects, we can conclude that intensive collection was practised, and that the composition of the material does not differ systematically from other major Viking Age settlement finds, including those from the ring fortress sites of Aggersborg and Fyrkat. The artefacts reflect a broad spectrum of common activities including weapon use, food processing, crafts and household production.

Reconstructing the excavation's survey systems, we can conclude that the quality of the contextual information is good enough to carry out an overall mapping of the distribution of artefact finds at Trelleborg, which is presented here for the first time. Based on the distribution, we can show that the artefacts found at Trelleborg, as at Fyrkat, provide evidence of activity areas in the ring fortress. However, only a few artefacts appear to have been left in a primary context in the fortress buildings. This argues against the theory that the fortress was destroyed and abandoned after a sudden destruction by fire.

In this way, the analysis of the artefacts adds important new depth to the picture of the more than 80-year-old excavation, and a monument that has been a focal point in the history of archaeological exploration in Denmark and continues to be a key site for the study of the Viking Age. The results presented here exemplify the potential that still reside untapped in early excavations. The resources kept in museum archives present an increasingly valuable part of the archaeological heritage and include the prime evidence for many important sites that were explored early on. As the present study exemplifies, digitizing such materials may be an arduous task of, reconstruction, research and renewed classification. This form of study now gains attention as ‘archive archaeology’ across many areas (Ward 2022; Frey and Raja 2024). Much remains to be done in this

field. The archives from the excavations at the Fyrkat and Aggersborg ring fortresses are a case in point, but many other archives and reports await attention.

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References

- Bender Jørgensen, L., Eriksen, P., eds. 1995. *Trabjerg. En vestjysk landsby fra Vikingetiden*. Aarhus: Aarhus Universitetsforlag.
- Birkedahl, P., 2000. Sebbesund – en handelsplads med trækirke ved Limfjorden – forbindelser til Norge. *In: Havn og handel i 1000 år. Karmøyseminaret 1997*. Stavanger (Dreyer Bok). 31-40.
- Christiansen, T.E., 1984. Trelleborgs alder. Arkæologisk datering. *Aarbøger for Nordisk Oldkyndighed og Historie* 1982 (1984), 84-110.
- Frey, J. M., Raja, R., 2024. Trends and Directions in Archive Archaeology: An Introduction. *In: J.M. Frey, R. Raja, eds. Trends in Archive Archaeology: Current Research on Archival Material from Fieldwork and its Implications for Archaeological Practice*. Archive Archaeology 5. Turnhout: Brepols. 1-7.
- Knudsen, M., 2023. The pottery from Posthustorvet. *In: S. M. Sindbæk, ed. Northern Emporium vol. 2: The networks of Viking-age Ribe*. Aarhus: Aarhus University Press. 21-51.
- Madsen, H.J., Sindbæk, S.M., 2014. Pottery *In: E. Roesdahl, S.M. Sindbæk, A. Pedersen, D. Wilson eds. Aggersborg. The Viking-Age settlement and fortress*. Aarhus: Aarhus University Press, 214-234.
- Meier, U. M., 2007. Die früh- und hochmittelalterliche Siedlung bei Schuby, Kreis Schleswig-Flensburg, LA 226. *Offa-Bücher* 83. Neumünster: Wachholtz.
- Nielsen, L.C., 1990. Trelleborg. *Aarbøger for Nordisk Oldkyndighed og Historie* 1990, 105-177.
- Nørlund, P., 1948. Trelleborg. *Nordiske Fortidsminder* 4.1. København: Gyldendal.

- Randsborg, K., 1980. *The Viking age in Denmark: the formation of a State*. New York, St. Martin's Press.
- Roesdahl, E., 1977. *Fyrkat. En jysk vikingeborg. II. Oldsagerne og gravpladsen*. Nordiske Fortidsminder B 4. København: H.H.J. Lyng & Søn.
- Roesdahl, E., Sindbæk, S.M., 2014. The Purpose of the fortress. In: E. Roesdahl, S.M. Sindbæk, A. Pedersen, D. Wilson, eds. 2014. *Aggersborg. The Viking-Age settlement and fortress*. Højbjerg: Jysk Arkæologisk Selskabs Skrifter, 373-414.
- Roesdahl, E., S.M. Sindbæk, Pedersen, A., Wilson, D., eds. 2014. *Aggersborg. The Viking-Age settlement and fortress*. Højbjerg: Jysk Arkæologisk Selskabs Skrifter.
- Runge, M., ed. 2024. *Nonnebakken. Odenses vikingeborg*. Odense: Syddansk Universitetsforlag.
- Runge, M.T., Gamble, B., eds. 2021. *Nomination of Viking-Age Ring Fortresses for Inclusion on the World Heritage List*. Aalborg: Forlaget Nordjylland.
- Schiffer, M. B., 2010. *Behavioral Archaeology: Principles and Practice*. S.l., Taylor and Francis Ltd.
- Sindbæk, S.M., 2008. Kulturelle forskelle, sociale netværk og regionalitet i vikingetidens arkæologi. In: Gammeltoft, P., Sindbæk, S., Vellev, J., eds. *Regionalitet i Danmark i vikingetid og middelalder*. Hikuin 35. Højbjerg: Forlaget Hikuin, 63-84.
- Sindbæk, S.M., ed. 2023. *Northern Emporium vol. 2: The networks of Viking-age Ribe*. Aarhus: Aarhus University Press.
- Sindbæk, S.M., 2024. *Trelleborg. Vikingetidens ringborge, I*. Aarhus: Aarhus Universitetsforlag.
- Smith, M.E., 2022: *Urban Life in the Distant Past. The Prehistory of Energized Crowding*. Cambridge: Cambridge University Press.
- Strömberg, M., 1978. En kustby i Ystad – före stadens tillkomst. *Ystads fornminneförenings tidskrift* XXIII. 7-101.
- Strömberg, M., 1981. Vattenförsörjning och verksamhet i forntidsbyn. *Ystads fornminneförenings tidskrift* XXIV. 21-60.
- Söderberg, B., Sten, S., 1994. Kungens Gårdstånga – från Odin till adel. *Arkeologi i Sverige* 3. Stockholm.
- Sørensen, S.A., Ulriksen, J., 1995. *Selsø-Vestby. Vikingernes anløbsplads ved Selsø*. Frederikssund: Museum Færggården.
- Ulriksen, J., 1998. *Anløbspladser. Besejling og bebyggelse i Danmark mellem 200 og 1100 e.Kr.* Roskilde (Vikingskibshallen).
- Ward, C., 2022. Excavating the archive/archiving the excavation: Archival processes and contexts in archaeology. *Advances in Archaeological Practice* 10(2). 160-176.