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AT THE DAWN OF MASONRY ARCHITECTURE – CHURCH REMAINS AND ASSOCIATED BRICK STRUCTURES AT KOROINEN, TURKU

The remains of an assumed 13th-century episcopal church and associated brick structures at the Cape of Koroinen, southwest Finland, were excavated in 1898–1902. The structures may constitute the first occurrence of masonry buildings, and the use of brick in mainland Finland. Such conclusions, however, have also been questioned. The evaluation of the discoveries has been difficult, because the excavation results were never thoroughly published. The present article re-examines the findings, and discusses their importance for the understanding of Koroinen.

The first wooden church at Koroinen had a rectangular nave measuring probably 20 by 10.5 m, and a narrow choir, 4.5 by 4.5 m in size. Inside the choir, a brick altar and brick-walled grave 2 may have been built. The altar foundation measured ca 1.2 by 1.1 m and was possibly erected entirely of bricks. These two structures were mainly constructed of ordinary wall bricks. The nave of the second wooden church measured ca 27.5 by 14.5 m, and it had a narrow choir as well. A brick podium for a baptismal font, as well as a sub-surface drain made mostly of bricks, was presumably connected with the second church. It seems likely that also a brick-walled grave 1 was built into the wooden choir. The wooden church was located at the same place where a choir of stone was later built. Apparently the masonry choir represented the first construction phase of a stone church. It was not planned to be tower-height, and it is not certain whether it was ever completed. Based on the archaeological finds, it seems that site was no longer used in the Late Middle Ages.

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Introduction

The present article[1] examines the remains of an assumed 13th-century church and associated brick structures at Koroinen in Turku, Finland (Fig. 1). It takes

[1] The article is based on a paper presented at the Conference on Church Archaeology in the Baltic Sea Region held on 26–30 August 2013 in Turku, Finland.

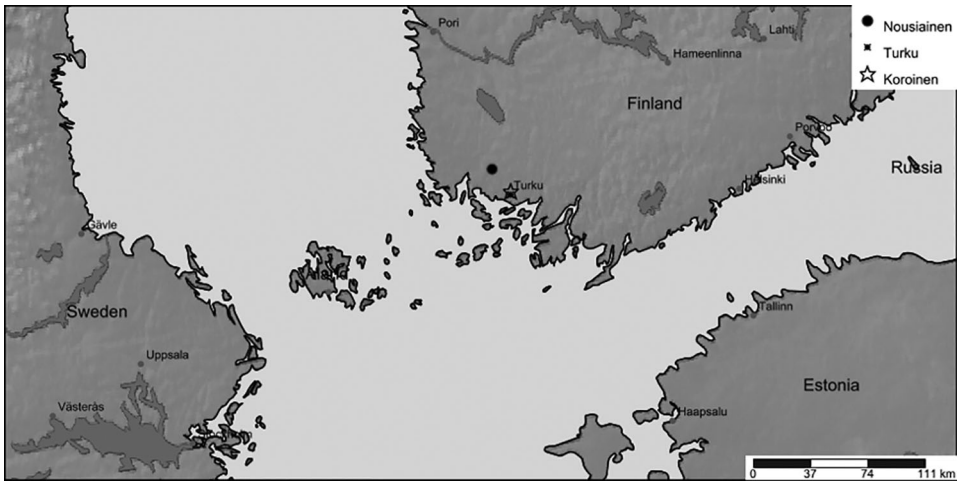

Fig. 1. Location of Nousiainen and Koroinen near Turku in Soutwest Finland. Map: Tanja Ratilainen and Shorthouse, David P. 2010. SimpleMappr, an online tool to produce publication-quality point maps [Retrieved from http://www.simplemappr.net. Accessed April 13, 2016].

a new look on the site's structures and especially on the use of brick, since the structures may constitute the first time in mainland Finland in which masonry structures were erected and brick was applied (Koivunen 2003, 54 f.; Hiekkanen 2007, 185 f.). This possibility was recently challenged when Markus Hiekkanen (2007, 186) suggested that the buildings could actually be late-medieval in date.

Owing to the abundance of archaeological material from Koroinen, only these masonry and brick structures at the centre of the site are dealt with in detail in the present article, while other structures by the river bank, interpreted as the bishop's residential buildings (see e.g. Koivunen 1979; 2003; Hiekkanen 2007), as well as more extensive architectural comparisons have been left for another occasion. Unfortunately no medieval written sources directly refer to the buildings or structures at Koroinen, and even more general sources related to site are very vague and ambiguous (see e.g. Gardberg 1971; Koivunen 2003). Therefore written sources are not in the scope of the article.

The emergence of the ecclesiastical administration

The early phases of Koroinen relate to the so-called Crusade Period, i.e. the 11th to the 12th centuries, when the organization of the Catholic Church was emerging in Finland. During the Middle Ages, the eastern part of Sweden, i.e. modern-day Finland, constituted one diocese, the Diocese of Turku (Hiekkanen 1994, 12 f.; Heininen & Heikkilä 2002, 20 ff.; Heikkilä & Lehmijoki-Gardner 2004, 352 f.). The Archdiocese of Uppsala was founded in 1164, and the Diocese of Finland, later the Diocese of Turku, was founded as part of the new archdiocese

in the course of the 13th century. The parish system was established in Finland from the 1220s to the 1240s, while the chapter was founded in 1276. These 13th-century institutions were responsible in collecting funds for the construction of new churches, and maintaining the clergy. The emerging profane administration was also involved. The Swedish kings organized three ledung journeys to south-west Finland, and they were followed by the erection of three major crown castles and the first town in the region, i.e. Turku. At the time of these administrative developments, the migration of populations from Central Sweden to the Finnish archipelago and coastal areas was strong. These processes made Finland eventually part of the Swedish realm (Heininen & Heikkilä 2002, 20 ff.; Hiekkanen 2007, 11 ff.; Haggrèn 2015, 379 ff., 420 ff.; Seppänen 2016, 140 ff.). These social processes also involved the introduction of masonry architecture in Finland, which according to the present research began in the 13th century, became more common in the 14th century, and extensive only in the 15th century (Uotila 2002, 8 ff.; 2003, 131; 2009, 306 ff.; Drake 2007, 115; Hiekkanen 2007, 24 ff.; Ratilainen 2010, 40 ff.; Ringbom 2010, 12 ff.; Seppänen 2012, 948 f.; Haggrèn 2015, 481 ff.).

The first cathedral of the Diocese of Finland was located probably in Nousiainen, ca 20 km northwest of Turku (Fig. 1). Sometime after 1229 the episcopal see was transferred to Koroinen, a cape formed by the joining Rivers Aurajoki and Vähäjoki (Fig. 2). Kirsi Salonen (2014, 16) has recently suggested that since the Bishop of Finland was active in Nousiainen at the beginning of the 1230s (1232, 1234), the transfer of the see to Koroinen did not happen right away after 1229. Finally, the see was relocated to the town of Turku, 1.6 km down-stream from Koroinen. The town was founded around 1300 (FMU 72; Gallén 1978, 321; Gardberg 2000, 22, 27; Hiekkanen 2007, 184, 188, on the church history of Finland, see Heininen & Heikkilä 2002).

The research history of Koroinen

At present, the Cape of Koroinen is separated from the mainland by a small man-made dry moat and an embankment. In the middle of the area of approximately 65 x 85 metres there are three E-W oriented lines of stones forming a rectangular foundation with some N-S oriented stones. At the east end of these structures there is a square masonry foundation without a west wall. In addition, there are remains of two masonry buildings by the southern river bank and a lesser brick structure in between them (Figs 2–3).

The site was excavated in 1898–1902, during the first two years by Hjalmar Appelgren and then by Juhani Rinne. A total area of 3,500 m^2 was excavated, and almost 3,000 finds recorded. The structures were conserved *in situ* in 1905, and reworked in the 1920s (Koivunen 2003, 41 ff.). Rinne did not publish the principal results on the building remains until 1941 (Rinne 1941, 35 ff.; see also Rinne 1914; 1926). After that several scholars have dealt with Koroinen (for a research history, see Koivunen 2003, 35 ff.), but the original material has never been thoroughly analysed or published.

Fig. 2. The site (circled) in the branch of the Rivers Aurajoki (left) and Vähäjoki (right) from the east. Photo by Auli Bläuer (1.8.2012).

The present article is a product of the on-going project *At the Dawn of the Middle Ages – An archaeological analysis of the 13th-century episcopal site of Koroinen, Finland* directed by adjunct professor Janne Harjula, and assistant professor Visa Immonen. The main purpose of this project is to analyse the artefacts and the structures excavated in 1898–1902 and publish the material as

Fig. 3. Locations of the structures at Koroinen. 1–3 Brick-walled grave, 4 altar foundation, 5 foundation for a baptismal font, 6–8 subsurface drain, 9 foundation of a masonry building, 10–12 stone foundations of wooden naves, 13 line of stones, function open, 14–15 stone foundations of wooden naves, A, B possible corner stones of a narrow choir. The remains of masonry houses and other structures south of the church by the river bank were excluded from the material (16). The radiocarbon-dated grave is marked with a grey oval area near the west end of structure 10. The brick waste (circled) discovered mostly at the east end of the church could be the crushed remains of the altar (4) and its foundation spread by ploughing. Scale bar 5 metres. Map: Juhani Rinne, modified by Tanja Ratilainen.

a whole in cooperation with other specialists. On a broader scale, the project aims at studying the processes that affected material culture in 13th-century Finland (on the project, see Harjula & Immonen 2009, 183 ff.; Harjula et al. 2012).

The outstanding level of documentation of the excavations, unusual for the time (see Hiekkanen 2006, 39ff.), permits us to carry out such a modern project. To Appelgren's credit we can count the creation of a homogenous coordinate system over the site (squares of 5 × 5 m) and sieving all the excavated earth. His work was continued and further developed by Rinne, who recorded all the coins on-site. The depth of the finds was recorded according to the shovelling layers. Rinne had also excavations plans and sections made and, most important of all, he kept notes. There are even some photographs taken by Julius Ailio during the excavation seasons of 1901 and 1902 (Koivunen 2003, 41 ff.).

On the basis of the coin finds, Koroinen remained in active use until the end of the 14th century (Riska 1964, 58 f.; Koivunen 1979, 7 ff.; Ehrnsten 2013b; for numismatic discussion on the coins, see Koivunen 1980; Sarvas 1979, 1980; Malmer 1980, 206 f., 23 ff.). Based on the description of the 17th-century scholar Petrus Gyllenius (1653 [1962], 160), it is evident that the buildings at the cape were in ruins by 1653. In a map from the year 1787 the area is marked as a meadow, and a hundred years later it was under cultivation (Koivunen 1987, 63; map: Nordenswan 1897; see e.g. Aspelin 1898, 1 ff.; Koivunen 2003, 39). Cultivation may have started around 1819 (Aspelin 1898, 6).

When reading Rinne's notes, and the results published in 1941 as part of the book on Turku Cathedral, it is sometimes difficult to comprehend which structures he is talking about and what was actually discovered – at the time of the excavations he practically did not have much of a clue of what he found. On the other hand, the idea of the Dominican Order acting at Koroinen strongly influenced his interpretations in 1941 as well as the misinterpretation of Petrus Gyllenius's description of 1653 (see Rinne's notes 1900–1902; Rinne 1941, 35 ff.). As pointed out by Pentti Koivunen (2003, 43), it seems as if Rinne did not have all his notes at hand when he later wrote about Koroinen.

It should be emphasized that the artefact analyses of the project have not yet been completed and therefore the interpretations presented here are mostly based on the discovered structures and may be considered preliminary. Furthermore, no original documentation has yet been digitalized or modelled, which may lead later to new ideas and interpretations. So far the project has only one ^{14}C dating result of the several planned ^{14}C and OSL datings, which hopefully will clarify the chronology of the site and its buildings.

Research history of the churches and associated brick structures

In the centre of the site, Rinne found mostly E-W and N-S oriented lines of stones, which according to him formed a rectangular nave measuring 27.5 m × 10.5 m without a narrow choir (Fig. 3, structures 11, 12, 14, 15). He interpreted the structure as the first wooden church of the site, which would have

burnt down, then being repaired and extended 4 metres to the north (Fig. 3, structure 10), after which it was converted into a three-aisled basilica. The six metre-long line of stones at the south side of the nave served as a cross-aisle gallery (Fig. 3, structure 13), originally much longer and with one grave showing, among other features, the influence of the Dominicans on the architecture. The brick structure in the eastern part of the nave was the remains of a brick floor (Rinne's notes 1900–1902; Rinne 1941, 44 ff.) (Fig. 3, structure 4).

The masonry structure at the east end of the church was a foundation for a choir-tower (Fig. 3, structure 9), which was built last onto the enlarged wooden church. Based e.g. on the brick size and coin finds, Rinne deduced that the use of the site already began at the end of the 12th century. The masonry building was erected sometime in 1266–1286 since the last of the three bishops buried at Koroinen, Bishop Catillus was buried there in 1286 in a brick-walled grave (Rinne 1941, 51 ff.) (Fig. 3, structure 1). After the see was moved to Turku, the church served as s parish church until the end of the 14th century (Rinne 1941, 57).

In contrast to Rinne, Iikka Kronqvist (1948, 11 ff.; 1979, 4 f.) suggests that there were actually two consecutive churches, both with narrow choirs. With some adjustments, this was later supported by other researchers (Kartano 1951, 103; Riska 1964, 57 ff.; Koivunen 1979, 49 ff.). According to Erkki Kartano (1951, 104 f.; supported by Gardberg 1971, 163; 2000, 28), the stone choir was the first stage of building the whole church in stone. Based on the coin datings, Tove Riska (1964, 58 f.) deduced that the raiding pirates burnt the buildings down in 1396. Koivunen (1979, 49 ff.; Klackenberg 1992, 314 f.; for further numismatic discussion on the coins, see Koivunen 1980; Sarvas 1979, 1980; Malmer 1980, 206 f., 23 ff.) pointed out that the distribution of the coins correlated with the consecutive churches; most of the coins dating from the 13th century were found in the lowest layers of the first church and the 14th-century coins in the upper layers of the second church. Furthermore, the coin studies supported the idea that the episcopal see was transferred to Koroinen only after 1229 (Koivunen 1979; 2003, 49; Talvio 2009, 306 ff.; see also Kronqvist 1948, 11 ff.; 1979, 4 f.; Kartano 1951, 103 ff.; Riska 1964, 57 ff.; Gardberg 1971, 149 ff.).

Later Marjaana Harjapää (1996, 58 ff.) presented a 3D reconstruction of the second church, suggesting that it was a stave church with a masonry choir-tower built around a narrow wooden choir. Markus Hiekkanen, in turn, suggested that remains of the stone building could also be a late medieval memorial chapel containing the graves of bishops. However, if the masonry choir was built in 1266–1286, it would be the oldest masonry building on the Finnish mainland (Hiekkanen 1994, 17, footnote b for Fig. 2; 2007, 185 f.).

Structures in the centre of the Koroinen plateau

A balanced study and interpretation of the building remains and the associated structures is not a simple task as they all more or less depend on one another.

However, in the next section the brick structures and the masonry building are discussed individually on the basis of Rinne's documentation, with further analysis and interpretations. Due to the lack of space, the dry-laid stone structures are not discussed in detail here.

Brick-walled graves 1–3

Brick-walled grave 1 was discovered in the middle axis of the masonry building (9). Brick-walled grave 2 was found on the west side of structure 4, and a third grave, double brick-walled grave 3 some 6 metres west of the latter (Rinne's notes 1902)[2] (Fig. 3). Rinne (1941, 44 f.) deduced that the graves 2 and 3 were contemporaneous with the enlarged, second nave and grave 1 was built in the masonry choir.

All the brick-walled graves were E-W oriented, mortared with lime applying usually stretchers and some cut bricks. The walls were a half of a brick, or one brick in thickness. The brick sizes varied between 27–30 × 12–14 × 8 – 10 cm. (Table 1). Graves 1 and 2 were apparently dug and built directly on natural clay, but grave 3 was founded on a 4–5 cm thick and hard layer of sand and clay. Under brick-walled graves 2 and 3 burials preceding them were discovered (Rinne's notes in 1902).

Rinne found a 3–4 cm thick layer of lime on the surface of the brick-walled grave 1. He could not decide whether it consisted of pieces of mortar or whether it was a limestone slab. The first whole skeleton was found under ca 70 cm thick fill and under it another, partly disturbed skeleton with a tin chalice and a paten was discovered (Rinne's notes 1902). Rinne (1941, 53 ff.) interpreted it as a bishop's grave and dated it according to Catillus's death to 1286. Immonen (2009, 125 f.) dated the communion vessels to the first half of the 13th century.

Table 1. Dimensions of the brick-walled graves 1–3 recorded by Rinne. Table: Tanja Ratilainen

Structure	Length (m)*	Width (m)*	Height (m)	Original number of brick layers according to Rinne	Brick sizes (min-max in cm)
Brick-walled grave 1	2	0.67	0.81–0.85	8	27–29 × 13–13.5 × 8–9
Brick-walled grave 2	2.6	0.67–1.05		7	28–30 × 13–14.5 × 8.5–10
Brick-walled grave 3 (double)	2–2.35	1.68–1.71		5	28–30 × 13.5–14.5 × 8.5–10

* Inner measures.

[2] On the west side of the brick grave 2, there was a grave covered with a limestone slab, and three bricks were laid at its northern edge, but they are not discussed in detail here due to the lack of space. Rinne did not pay any attention to these discoveries in his notes.

A coin (KM52100:513) dating from the 1360s was discovered inside the grave in 1901, but Rinne does not describe the context more precisely than that. Koivunen (1979, 48) interpreted it as belonging to a secondary burial. This seems likely; Rinne would have probably paid more attention to it if it had been discovered clearly in connection with untouched burials.

Rinne assumed that brick-walled grave 2 might have been covered with bricks, since in the fills of the grave he found two loose bricks of special size: 25.5 × 16 × 5.5 and 22 × 14.5 × 5.5 cm respectively. The fill continued to a depth of some 20–30 cm and under it the first skeleton was discovered. Seven coins (KM52100: 490–496) dating from the 1340s–1380s were found beneath the skeleton and between the legs. This individual, however, was not the one for whom the grave was built, but further down another skeleton was recorded. In between these skeletons there was a 3–4 cm thick layer of charred wood, wood chips and bark (Rinne's notes 1902; Ehrnsten 2013b; cf. Koivunen 1979, 48).

The stratigraphy of the layers inside brick-walled grave 3 is complicated since remains of several burials were found in it. At the bottom of the grave, however, wall bricks were discovered under both ends of two coffin remains. Rinne found six bracteates (KM52100:668–673) in the fill close to the surface of the grave. Half of them were dated to 1210–1270 and another half to the 1340s–1380s (Rinne's notes 1902; Koivunen 1979, 48; Ehrnsten 2013b). The dress fastener (see Immonen 2014, 53 f.) with a heraldic emblem, which was possibly found in the fine sand around the lowest skeleton in the northern chamber (Rinne's notes 1902), was dated to the 14th century (Taavitsainen 1981, 216 ff.; Immonen 2009, 300; 2014, 55; 2015, 317).

Discussion and interpretation

Ordinary wall bricks were used not only for the walls of the graves described above but also under the coffins (grave 3). It is possible that the thin bricks found in the fill of grave 2 were applied to cover the grave, but they were not perhaps in their original use.

The location of brick-walled grave 1 in the middle of the masonry building appears to support the idea that it was built inside it, as Rinne (1941, 44 f.) saw it. However, if a narrow wooden choir had been located exactly at the same place, it is equally possible that brick-walled grave 1 was first built in the wooden choir. Furthermore, it can be asked whether or not the brick-walled grave was made for Bishop Catillus in 1286, since all the ordained could be buried with communion vessels (Andersson 1963, 169; Rodwell 2012, 323; see the discussion in Immonen 2009, 125 f.). However, based on the dating of communion vessels and the coin found in the grave, it is possible that the first burial in brick-walled grave 1 was made in the 13th century and it continued to be used until the second half of the 14th century.

The location of brick-walled grave 2 on the middle axis of structures 11 and 12 and near structure 4 may indicate that it was used at the same time as they were, as Kronqvist (1948, 11 ff.; 1979, 4) suggested. The coin finds reveal that the burial above the first one was likely made during the second half of the 14th century. Since there was a layer separating the lowest and the second-lowest burial, the first burial in brick-walled grave 2 dates from before the mid-14th century.

Double brick-walled grave 3 is not clearly related to any of the structures around it. According to Harjapää (1996, 60), the southern chamber was built shorter due to a pillar of the nave located on its west side (see Fig. 3). This is possible, but at this point of research, the question must be left open. Neither the coins found in the fill nor the dress fastener help us define securely the period when brick-walled grave 3 was built, but this may have happened in the second half of the 14th century.

The lowest skeletons found in connection with brick-walled graves 2 and 3 were clearly buried there before the graves were built, since they were found under the lowest level of brick walls and their body parts continued outside the walls. A large piece of brick, however, was found under the left arm of the skeleton located under the southern wall of the double grave (3), which shows that at least that burial must date from the historical period, as Rinne (notes 1902) presumed as well.

Unfortunately, Rinne did not save any brick samples from brick-walled grave 1 and thus no further direct evidence on the dating of the structure will be available. However, the wood samples, possibly remains of coffins relating to the first burials in brick-walled graves 1 and 3, may help us date them more accurately in the future.[3]

Brick structure 4 – an altar foundation

Brick structure 4 is located 40 cm east of brick-walled grave 2 and in between structures 10 and 12 (Fig. 3). The size of the structure is 1.2 m × 1.10 m. Lime mortar was applied between the bricks, which were laid in 1–3 courses. A layer of sand measuring 120 × 80 × 30 cm was discovered under the structure (Fig. 4).

The structure was first interpreted as a child's grave covered with bricks, because there was a thick layer of sand limited to the area beneath it. Also tiny pieces of bones were discovered in the sand (Rinne's notes 1902). Later Rinne (1941, 48) decided that it was remains of a brick floor belonging to the enlarged church. Kronqvist (1948, 11 f.; 1979, 4) suggested it was rather the base for an altar, since it stood in the middle axis of structures 10 and 12, and that it was originally much longer, even as much as ca 2.30 metres.[4]

[3] The bricks saved from grave 2 (KM52100:1458, 1459) and 3 (KM52100:1455) are unfortunately missing.

[4] Dimensions given here are based on the reconstruction presented in the article.

Fig. 4. Altar foundation (structure 4) in front. Brick-walled grave 2 in between the altar and a grave covered with limestone in the back, which located 10 cm higher than the brick-walled grave 2. Photo by Julius Ailio / Archives of the National Board of Antiquities.

Discussion and interpretation

In the middle of the structure Rinne (notes 1902) reported some crushed *in situ* bricks, according to which there had been two layers of bricks. It is therefore possible that the structure was originally higher. Furthermore, if the structure had been the remains of a brick floor, the 30-cm-thick layer of sand would not have been limited only under it, but been spread all over the choir. In addition, the top surface of the structure was at the same height as the remaining wall of brick-walled grave 2 (ibid.), which can also be confirmed in the photographs (see Fig. 4). According to Rinne (ibid.) brick-walled grave 2 had, however, originally at least two more layers of brick, which either indicates that the grave located partly above floor level or that the structure in question is rather a foundation, meant to be underground. It is exceptional that a brickwork structure was made without a dry-laid stone foundation (see e.g. Hiekkanen 2003, 86 ff.), but all the evidence considered above, it seems more likely that the structure 4 is a foundation for an altar rather than the remains of a brick floor (see Fig. 4).

Assuming that brick-walled grave 2 was built symmetrically in relation to the altar, the altar may have been three bricks wider in the northern part, thus in total some 160 cm. However, if we are to believe Rinne that the sand was limited to

120 × 80 × 30 cm, then the length seems unlikely. The size of the discovered brick foundation could after all be original. Probably the whole altar foundation was entirely made of bricks. The remains of bricks recorded in the map (Fig. 3) mostly in the east end of the church could be crushed remains of the altar and its foundation spread by ploughing.

Brick structure 5 – foundation for a baptismal font

Rinne (notes 1902) paid no attention to the brick structure 5, located in the mid-axis of the structures 10 and 12 (see Fig. 3), but he recorded it and saved some samples.[5] The structure was E-W oriented and it measured 0.8 × 0.4 metres. Five bricks were laid on their flat side close to each other. On their south side three bricks were put lengthways one after another. About 2 m west to the structure a layer of sand (40–80 cm in depth) of which contours were not clearly marked, was recorded on the map. It is not known if there was lime mortar between the bricks. Five bracteates (KM52100:684–688) were apparently found under the eastern part of the structure. Among the datable coins there is one minted in ca 1220–1280 and three in the 1360s–1370s (Ehrnsten 2013b). It is not clear that all the coins were deposited at the same time (see Koivunen 1979, 45 f.). However, the structure seems to have existed at least sometime after the 1360s–1370s (see Koivunen 1979, 45 f.). In addition, a fragment of a limestone baptismal font (KM52100:1425) was discovered by the river bank, inside the remains of a masonry building on the west side (Reutersvärd 1978, 173; Riska 1987, 229; Hiekkanen 2007, 186) (Fig. 3).

Discussion and interpretation

Koivunen (1979, 45 f.) suggested the structure was a foundation for a baptismal font constructed in the second wooden nave. This seems likely, since it is known from other Nordic churches that fonts were usually located in the middle axis of the nave opposite the southern doorway and with a view to the high altar (Lindgren 1995, 30 ff.; Hiekkanen 2003, 118; 2005, 12 ff.; see also Cinthiò 2002, 188; Nilsson 2009, 87, 263). The second explanation for the structure could be that it served as an altar foundation. However, side altars were usually near pillars or nave walls (Hiekkanen 2003, 88; see also Cinthiò 2002, 188),[6] making this seem less likely as there is no evidence of pillar foundations. The third explanation, i.e. brick floor, appears least likely; one would expect to find more

[5] Two bricks were catalogued as KM52100:1451, but unfortunately they are missing.

[6] In some significant churches an altar dedicated to the Holy Cross was located in the middle axis of the nave, but usually on the west side of the triumphal arch (Nilsen 2003, 123 f.). In the case of a child's grave, Rinne would probably have paid more attention to it.

of its remains elsewhere in the nave. Again, it is unusual to build directly on the damp ground without dry-laid stone foundations, but the foundation for a font podium seems the most likely interpretation for the structure at the moment. The layer of sand recorded near the structure could suggest that the structure was founded on sand (map 1:100, No. 853.2.105). In addition, Rinne (notes relating to the grid square 22–16) describes the soil to be sandy.

The structure may have originally been larger and perhaps higher with a couple layers of bricks forming the steps of the podium. The nearest graves on the south and north sides are located one metre from the structure. This might suggest that the area was reserved for a larger structure than Rinne discovered. However, if it was originally a simple podium with only one layer of bricks, embedded possibly on sand or even clay, it would have served the stability of the font better than just bare ground.

Brick Structures 6–8: subsurface drain

On the north side of the church remains Rinne found two E-W oriented structures of which the western one was laid of bricks (7), and the eastern one was laid of stones (6) and to which a N-S oriented brick structure was connected (8) (see Fig. 3). At first Rinne (notes 1901) called the brick structures a fence, but later he concluded that it must have been a subsurface drain for leading water away from the church (Rinne 1941, 49 f.). Harjapää (1996, 58) suggested that structure 6 was a stone foundation for a wooden wall structure protecting the stave church from water, while the remaining structures 7 and 8 functioned as a drain.

In brick structure 7 there were mostly 3 layers of bricks. In the first one bricks were put on their side and lengthways. On top of them bricks were put on their flat side and lengthways, and on top of these the third layer was put on their flat side and across the structure. In that way a structure 25–27 cm wide and 33–39 cm high was created.[7] Structure 7 was described as being 40–45 cm deeper in the ground than the line of stones (structure 10) constituting the north wall of the enlarged nave. In structure 8, the bricks were partly laid differently and there were also some stones in between, but they also formed a channel. Structures 7 and 8 clearly sloped from the east to west towards the Rive Aurajoki and from south to north towards the River Vähäjoki. No remains of mortar were found between the stones. Rinne (notes 1901) does not describe the structure 6 in his notes, but only mentioned that it was aligned with the structure 7. Later he (1941, 50) described it as built of grey stones put on their sides above which stone slabs were laid. In the photograph the structure looks like Rinne described it (see Fig. 5).

[7] Dimensions of the bricks were in length 25–27 cm, in width 11–12.5 cm, and in thickness 7–8.5 cm.

Fig. 5. Structures 6 and 8 seen from the NW. Photo: Val137-16, Ailio / Photo Archives of the Museum Centre of Turku.

Discussion and interpretation

Structures 6–8 probably formed a subsurface drainage system originally at least ca 32 metres in length from east to west, and measuring at least 26.5 metres from south to north. This can be deduced firstly from structures 7 and 8 which sloped towards the rivers. Secondly, structures 6 and 8 are at the same level and

are jointed together neatly at the corner (see Fig. 5). Thirdly, structures 6 and 7 are aligned. Fourthly, Rinne (notes 1900, 1901) reported that in between structures 6 and 7 where there is a gap, a large amount of brick waste was discovered. Fifthly, all the structures formed a channel. Therefore, structures 6–8 likely functioned as subsurface drain.

Since the structures 6 and 7 are located ca 1.5 metres to the north from the foundations (10) and run alongside it, it is likely that the subsurface drain was built at the same time or after the second wooden church was erected. Structure 6 cannot have functioned as a foundation for a wall structure protecting the stave wall from water, since all the structures in question were originally meant to be underground. Unfortunately, no samples of the structure were preserved, so we have to trust Rinne's observation that the bricks used for it were heavily fired, which may show that the builders understood that they would resist water better than normally fired bricks. In addition, an observation regarding the stratigraphy must be made: the construction works of the drain in the eastern (8) and northern parts (7) cut through some graves, but graves were also built above them (Rinne's notes 1902). It is therefore evident that the burial ground was still in use after the drain was built.

Masonry building 9

The remains of a masonry building (9) located on the east side of all the structures in the level area measured 12.5 × 12 m × 1.50–2.0 m (Fig. 3). Rinne (1941, 54 f.) suggested it was a foundation for a choir-tower of stone. In the notes (1902) he stated that there was no brick waste at all in the area of the structure, but later (1941, 53) interpreted that the brick waste found by the river bank above the eastern masonry building was transferred or had slid down from structure 9 and therefore the building probably had a triumphal arch and vaulting and windows made of bricks.

Kronqvist (1948, 11 ff.; 1979, 4 f.) suggested that structure 9, a choir, was built at the same time as the wooden nave, but he did not support the idea of a choir-tower, since there was no west wall left. Carl Jacob Gardberg (1971, 161 f.; 2000, 27 f.) showed that Rinne's reasoning about the tower was not valid; Gyllenius's description of the high ruin at Koroinen did not apply to the cape, but to the bishop's estate on the other side of the embankment. According to Harjapää (1996, 58 ff.), the enlarged wooden church was a stave church with a choir-tower of stone built around an older narrow wooden choir. Hiekkanen (1994, 17, footnote b for Fig. 2; 2007, 185 f.) suggested that the structure could also be a late medieval memorial chapel containing the graves of bishops.

The structure was partly made of very large blocks up to 2–3 metres in length and 20–50 cm in thickness. There were 1–2 stone layers left and between the stones keystones and mortar were detected, even a mortar sample (KM52100:570) was taken. Rinne (notes 1902) considered it evident that the stones were mortared

with lime and concluded they were meant to be underground (see Fig. 6). Under the stones Rinne recorded a 5–6 cm thick layer of sand overlaying natural clay. He found no evidence of wooden foundations under the stones (Rinne, notes 1902). In addition, Rinne argued that originally the building remains had a western foundation, but they had been more severely destroyed than the other remains.

Fig. 6. Structure 9, the southern foundations of the masonry building seen from the west. Photo by Julius Ailio / Archives of the National Board of Antiquities.

Based on the photographs, the stones were partly shaped and, interestingly, laid in a way as if they were meant to be seen. The flat surface of the stone was laid as the interior and exterior surface of the 'shell wall', even in the first layer of the foundations, which must have been underground. It is difficult to discern from the black and white photographs if there are remains of lime mortar between the stones, but it looks like there is mostly earth. There may be traces of lime on some upper or side surfaces (see Figs 6–7).

According to Rinne (1941, 44, 56 f.), brick-walled grave 1 and the grave covered with a limestone slab on its north side were the only graves dug through the fill brought into the building. All the other graves were made only into the natural clay. A map made by Rinne clearly shows that the foundations cut through some of these graves, which makes it evident that the burial ground was in use by the time the masonry building was constructed (see Fig. 3).

A total of four coins (KM52100:513–516) were discovered in the building remains. In addition to the coin inside brick-walled grave 1 (the 1360s), another coin dating from the same period was found above the limestone slab remains, covering the grave on its north side. Another two coins located 60 cm deep in the western part of the building were minted in the 1370s–1380s, and 1290–1318 (Ehrnsten 2013b).

Fig. 7. Brick-walled grave 1 and the grave covered with a limestone slab on its north side in the masonry building (9). Note the level of the foundations in relation to the graves. Photo by Julius Ailio / Archives of the National Board of Antiquities.

Discussion and interpretation

The large stones on the edges and small stones in the middle show that the structure was meant to serve as the foundation of a masonry building (see e.g. Andersson & Hildebrand 2002, 106 f.) It is not certain that the lowest layer of stones was mortared with lime, but that is possible. Of the stones recorded on the west side of the building it is impossible to know now which of them are in their original position or if there were more of them originally. The absence of clear foundations could suggest, however, that originally there was no solid west wall. In that case, the building was not a chapel but rather a choir (cf. e.g. Bonnier 2008, 135 ff.).

The whole masonry structure seems to have been founded far too lightly. One would expect the foundations to continue much deeper in the ground if they were meant to bear a masonry wall (see Andersson & Hildebrand 2002, 102 f.) and especially a tower wall. It seems reasonable to assume that there were originally at least 1–2 more stone layers in the foundations. Appelgren's observation (1898) that the first stones began to appear in the depth of 40 cm, support such a conclusion. Therefore the underground foundations might have originally been only ca 90–100 cm high.

The width of the structure (1.5–2 m) suits fairly well with Hiekkanen's (1988, 20, note 2 and references therein; 2003, 34) idea that the widths of medieval church foundations vary between 2–4 metres, and the width depends upon the quality of the soil as well as the possible existence of wooden foundations. Nevertheless, if we take into consideration the height of the underground foundations, the masonry wall planned above them cannot have been very thick and high. We cannot be absolutely sure that the builders did not use any wooden foundations. In fact, they may have decayed as seems to have happened to most of the organic matter on the site and this is probably the reason why Rinne did not find them. However, it seems very unlikely that the building had the height of a tower (cf. e.g. Hiekkanen 1994, appendix 1; Herrmann 2007, Katalog; Bonnier 2008, 136 ff.; Bengtsson 2014, 41).

According to Rinne (1941, 57), brick-walled grave 1, as well as the limestone slab of the grave on its north side located at the floor level of the stone building. Comparing the structures and the stone foundations, it seems unusual that the floor level would have been at the same level as the lowest layer of the underground foundations (Fig. 7). In fact, the floor should have been higher, especially if there were originally more underground stone layers in the masonry foundations, as seems probable. Thus, based on these arguments, it is more likely that the top level of the graves indicated the floor level of the narrow wooden choir and not at all the floor level of the masonry choir.

The nature of the layers inside the masonry building is not clear either. Rinne (notes relating to the grid square 13–12/26–27) described that in the area near brick-walled grave 1 there was mostly soil mixed with clay up to a depth of 70 cm. But he later (1941, 44, 56 f.) mentioned that there was sandy fill under the floor

level of the masonry building. The fill overlaid the natural clay in which all other graves were dug except for the ones mentioned above. It can be questioned if any sandy fill was brought inside the masonry building.

As Harjapää (1996, 61) and Hiekkanen (2007, 185) have pointed out, it is strange that there does not seem to be any proper foundations for a triumphal arch in the structure, which was typical of the churches of the time. In addition, Harjapää (1996, 61 ff.) found it peculiar that the south wall of the choir was one metre longer than the north wall, arguing that it could suggest that the building works were interrupted. However, she did not consider it credible that an unfinished church was in use until the end of the 14th century and explained the lack of structures in a fairly complicated manner.

However, there are more odd features in the masonry building remains. It is peculiar that there were no altar foundations. In addition, the north and south foundations seem to penetrate through the east wall of the presumed wooden nave. This would mean that the builders had to deconstruct it partly, or entirely in order to be able to build masonry walls (see Fig. 3).

If a narrow wooden choir had preceded the masonry one, it should have been located in the same place and been as large as the masonry one. Missing stone parts such as the altar or the triumphal arch foundations could be explained by the heavy dismantling or re-use of the building materials during later periods. On the other hand, they could, among other things, indicate that the stone building was never finished. Since it seems that the floor level defined by the graves is not likely that of the masonry building, but of the wooden choir, then the possibility of an unfinished building project seems even more likely. When this exactly happened has to be left open for now.

Results and interpretation of the church remains

The first wooden church

Based on the recorded structures it seems likely that the nave of the first wooden church was 10.5 metres in width (Fig. 3, structures 11, 12). In contrast, the total length of the first nave is more difficult to estimate. Kronqvist's suggestion (1948, 11 f.; 1979, 4) that the length was some 15 metres was based on the gap at the east and west end of structure 11 as well the location of brick-walled grave 2 and the altar on its east side. Koivunen (1979, 47, 49 ff.) thought roughly the same; the length of the nave was 16 metres, with the west wall located ca 4 metres east of the structure 14, and the east wall reaching as far as half way to brick-walled grave 2 on both sides of which lay stones that could have been suitable corner stones of the narrow choir (A and B in Fig. 3). The rectangular nave therefore measured 16 × 10.5 metres. However, the location of the graves, the distribution of coins and the stone foundations (11–12) as such do not clearly indicate that the first west wall of the nave was located there as Kronqvist and Koivunen suggested.

Firstly, there are 13th-century coins found from the west side of the assumed west wall. Secondly, some of the graves would be expected to be clearly inside the 16-metre wall, if that was the case. It seems more likely that the west wall was originally 4 metres further west (structure 14 in Fig. 3).

According to Kronqvist (1948, 11 f.; 1979, 4), the choir of the first church was 3 metres narrower than the nave, its total length from north to south being ca 7.5 m. The width of the choir was ca 5 metres (see Fig. 8). Koivunen (1979, 47, 49 ff.) suggested that the narrow choir was a square of ca 4.5 × 4.5 m. This was based on the large stones located 1.5 metres to north and south of brick-walled grave 2. These stones would have been located in the corner of the nave and the choir (see Fig. 9). Based on the location of brick-walled grave 2 which was the desired closest possible to the altar (see e.g. Meier 2007, 437; Rodwell 2012, 222),

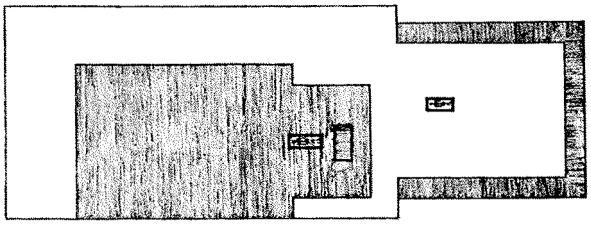

Fig. 8. Reconstruction of the two consecutive churches presented by Kronqvist. The choir of the first wooden church was 3 metres narrower than the nave. The altar in the reconstruction was fairly large, over 2 metres wide. Plan: Iikka Kronqvist 1948, 11.

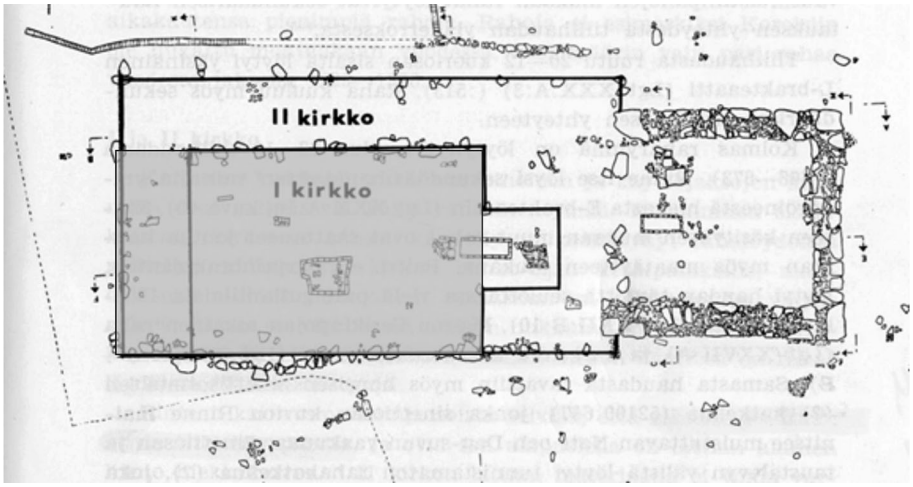

Fig. 9. The plan of the first and second wooden church according to Koivunen (1979, 47) in which the nave, measuring 20 × 10.5 m, is marked as grey area. Map: Pentti Koivunen 1979, 47, modified by Tanja Ratilainen.

possible corner stones on its both sides (Fig. 3, A, B) and the probable original size of the altar (structure 4, 1.20 × 1.10 m) Koivunen's suggestion of the size and location of the narrow choir of the first church seems more likely. The dating of the first burial in brick-walled grave 2 prior to the mid-14th century is not in contradiction with the interpretation.

Consequently, the east wall of the first nave could not have been located where Rinne (notes 1900–1902; 1941, 44 ff.) and others (Gardberg 1971, 159 ff.; 2000, 28; Hiekkanen 2007, 185) place it, i.e. the total length of the first nave cannot be 27.5 metres but instead 20 metres. The fact that there is a gap at the east end of the northern part of the foundations (structure 11) could confirm that the nave was originally shorter than 27.5 metres. In that case, the stones at the east end of the southern foundation (Fig. 3, structure 12) should have originally belonged to the second nave.[8]

The second wooden church

Based on the stone structure found by Rinne (Fig. 3, structure 10), the second wooden church was likely enlarged 4 metres to the north and 7.5 metres to the east after which it was a 27.5-metre-long and 14.5-metre-wide rectangular nave (Fig. 3, structures 10, 12, 14, 15). There are no actual remains of a narrow wooden choir, but it seems probable that it was located at the same place as the stone choir. It seems likely that brick-walled grave 1 and the multi-burial grave covered with a limestone slab on its north side were built in the wooden choir and not in the masonry building as previously interpreted.

The width of the nave, however, can be again questioned, since there was a five-metre-long line of E-W-oriented stones (structure 13) found ca 2 metres apart from structure 12 (see Fig. 3). Instead of a cross-aisled gallery, could these stones indicate the location of the south wall of the second wooden nave? In that way the masonry building would have been more symmetrically positioned in relation to the wooden nave. There are, however, so few stones left that it seems an exaggeration to interpret the south wall of the second church as having been located there. In addition, one would expect more graves to be found in the area, if it had been inside the nave. Most importantly, the foundation of the baptismal font is located in the middle axis of structures 10 and 12, which were most likely the walls of the second nave. Therefore, it seems likely that the second nave was 14.5 metres in width, and the purpose of the stones on the south side must be left open for the time being.

At this stage of the project, neither the building technique applied in the wooden churches nor the number of aisles in the naves is discussed here. A couple of observations regarding Harjapää's reconstruction of a second wooden church of

[8] It is strange that Rinne did not record any graves besides the brick-walled ones at the east end of the nave. The reasons for building another wooden church or a stone church or for abandoning the site later will be analysed thoroughly according to finds and layers on other occasion.

stave construction can, however, be made. Firstly, according to Harjapää (1996, 58), a corner-joined timber building more than 10 m in width, in this case 14.5 metres, would not have been technically convenient. However, the possibility of combining corner jointing and post-and-plank technique must be taken into consideration (Vuorinen 2009, 48 and references therein, 88, 130, 132; Seppänen 2012, 632 and references therein). Secondly, there is evidence from Sweden that in some rare cases the post-and-plank technique alone may also have been applied in church buildings (Bonnier 2008, 130). Thirdly, the structures on the north side (6–8) were likely sub-terrain and therefore structure 6 could not have functioned as part of a stave church.

The third church – an interrupted stone church project?

Based on the location of the structure at the east end of the wooden nave, it seems likely that the foundations of a masonry building measuring 12.5 × 12 m × 1.50–2.0 m were those of a choir. Based on the light structure of the foundations, it was not a tower-choir. The lack of certain elements even suggests that the building works, which probably included a stone nave, were never finished. However, this is something we have to study more thoroughly in the future.

The building remains were previously dated according to the compelling assumption that Bishop Catillus was buried in brick-walled grave 1. As shown above, it is not, however, certain that a bishop was buried in the brick-walled grave, or that the grave was constructed in the masonry building in the first place. Furthermore, the coins found inside the building are not very helpful. Therefore, other dating possibilities have to be considered in future.

On the land-use of the site

The active use of Koroinen seems to have ceased at the end of the 14th century as most of the 283 coins found by Rinne date from the 13th and 14th centuries (Ehrnsten 2013b; see also Koivunen 1979; Talvio 2009; for earlier numismatic discussion on the coins, see Koivunen 1980; Sarvas 1979; 1980; Malmer 1980, 206 f., 23 ff.). In theory, the circulation of coins after 1363 was unlimited, but it is considered likely that coins minted after that time usually did not circulate for more than a generation, i.e. 20–30 years (Jonsson 2005, 16; Ehrnsten 2013a, 10). Hence, except of two coins (KM52100:823 – 1363–1420, KM3480:1–2 – 1350–1422), all other coins would have been out of use by the 15th century (Sarvas 1979, 313 f.; Ehrnsten 2013b). Furthermore, there is only one certain coin from the late medieval period (1478–1503; KM52100:200; Ehrnsten 2013b), and four unidentified crown-headed bracteate fragments, which may date from the 15th century, but might have been minted in the 14th century as well. Importantly there are no coins from the early modern period at all. It is only from the 17th century onwards that the number of coins increases (Koivunen 1979, 36 f.; Ehrnsten 2013b). In addition, Jenny-Maria Montin Tallgren donated 47 newer

Swedish copper coins found at the cape (Sarvas 1979, 314), which according to Koivunen (1980, 105) were mostly collected in the area of the Koroinen estate, i.e. outside the embankment. The increase in activities at Koroinen is also supported by the assemblages of some post-medieval find groups.[9] It must be recognized, however, that the overall analyses of the finds have not been carried out yet.

The only radiocarbon date acquired so far gave the range of 1270–1400 calAD (95.4%) for a piece of textile found in a single grave located in the northwest corner of the second nave (Ua-45957; KM52100:387; 665 ± 35 BP). The textile was found among pieces of decayed wood located alongside the skeleton in grave No. 8, in grid square 146–150 (Rinne, notes 1900–1902) (Fig. 3). More samples are being dated, but at least this one is not in contradiction with the idea that the most active period at the cape was prior AD 1400.

The burial ground of Koroinen was in use before brick-walled grave 2 was built in the first wooden church, but for the time being the age of the older burials must be left open. The burial older than brick-walled grave 3, however, can be dated to the historical period. It must also be noted that the burial ground was still in use after the sub-surface drain was built.

Conclusions

Mostly ordinary wall bricks were used for the structures relating to the church buildings in the middle of the site of Koroinen. The first wooden church contained a rectangular wooden nave most probably measuring 20 × 10.5 metres and a narrow wooden choir measuring 4.5 × 4.5 metres, in which a brick altar and brick-walled grave 2 were built. The altar foundation of the first wooden church appears to have measured 1.20 × 1.10 cm and was perhaps entirely a brick structure.

The nave of the second wooden church probably measured 27.5 × 14.5 metres. The remains of the brick podium for the baptismal font as well as the sub-surface drain mostly of bricks are presumably connected to the second wooden church, which also seems to have contained a narrow wooden choir. It was probably located at the same place where the stone choir was later built. Structure 6 could not have functioned as a part of stave church structures. It is not certain that brick-walled grave 1 was first used in the masonry choir, as previously assumed. In fact, it seems more likely that it was first built in the narrow wooden choir. The masonry choir was perhaps the first stage of building a stone church and it was not planned to be of tower height. It can be doubted if it was ever actually finished. Based on the analysed finds, so far mostly coins, it does not seem likely that the site was actively used in the late medieval or early modern period. This, however, has to be studied more carefully in the future with the aid of natural-scientific dating methods.

[9] Fragments analysed so far are the post-medieval roof tiles (by Tanja Ratilainen) and clay pipes (by Mika Ainasoja).

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KESKAJA KOIDIKUL – 13. SAJANDI PIISKOPIRESIDENTSI ARHEOLOOGILINE ANALÜÜS

Resümee

Artiklis on käsitletud Soomes Koroinenis asuvaid tõenäoliselt 13. sajandist pärinevaid kiriku- ja sellega seotud tellisehitiste jäänuseid. Tegemist on varem käsitletud teema uue analüüsiga, kus on vaadeldud kompleksi struktuuri ja erilist tähelepanu on pööratud tellisekasutusele müürides. Väidetavalt on Koroinen Mandri-Soomes esimene kivi- ja tellisehitis (Koivunen 2003, 54 f.; Hiekkanen 2007, 185 f.), kuid see teooria on viimasel ajal kahtluse alla seatud ning ehitiste jäänused on dateeritud hiliskeskajaga (Hiekkanen 2007, 186). Koroineni kompleksi puudutav materjal on väga ulatuslik, mistõttu on artiklis käsitletud vaid selle keskmes asuvaid müürijäänuseid. Kompleksi jõeäärsete müüristruktuuride, võimaliku piiskopiresidentsi problemaatika käsitlemist (vt näiteks Koivunen 1979; Hiekkanen 2007) kavandatakse järgnevates artiklites.

Artikkel on osa projektist „At the Dawn of the Middle Ages – An archaeological analysis of the 13th-century episcopal site of Koroinen, Finland“, mida juhendavad Visa Immonen ja Janne Harjula. Projekti eesmärgiks on analüüsida aastail 1898–1902 toimunud arheoloogiliste uuringute käigus leitud kompleksi ja arheoloogilisi leide ning publitseerida analüüsi tulemused. Projekti üldiseks eesmärgiks on Soome 13. sajandi materiaalse kultuuri uurimine (projektist vt Harjula & Immonen 2009, 183 ff.; Harjula et al. 2012).

Vaadeldava kompleksi keskmes oleva kiriku ja sellega seotud ehitiste müürides on kasutatud tavalisi müüritelliseid. Algne puukirik oli nelinurkse pikihoonega (mõõdud umbes 20 × 10,5 m) ja kitsa kooriga (mõõdud umbes 4,5 × 4,5 m) (joon 9, halliga markeeritud piirkond), kus asus tellistest altar (joon 3: 4) ning tellismüüridega hauakamber nr 2 (joon 3: 2). Puukiriku altari vundament oli arvatavasti mõõtudega 1,20 × 1,10 m ja võis täielikult tellistest ehitatud olla (joonis 3: 4). Teise puukiriku pikihoone oli nähtavasti suurusega 27,5 × 14,5 m (joon 3: 10, 12, 14, 15). Tellistest ristimiskivi poodiumi jäänused (joon 1: 5) ja maa-alune drenaaž (joon 1: 6–8) on tõenäoliselt seotud teise puukirikuga. Ka sellel oli usutavasti kitsas puidust koor (vt joon 9). Viimane asus vististi seal, kuhu hiljem ehitati kivist kooriruum (joon 3: 9). Pole kindel, et tellismüüridega hauakamber 1 (joon 3: 1) oli esmakordselt kasutusel kivist kooriruumi ajal, nii nagu varasemad uurijad on eeldanud. On tõenäoline, et see ehitati juba varasema kitsa puidust kooriruumi ajal (ei ole joonistel nähtav). Kivist kooriruum oli ilmselt kivikiriku ehitamise esimene etapp ja seda ei planeeritud tornikõrguseks ehitada. Pole kindel, kas see kunagi üldse valmis. Tuginedes leiumaterjalile, peamiselt müntidele, ei ole usutav, et kompleksi oleks hiliskeskajal või varauusajal aktiivselt kasutatud. Edaspidi tuleb seda loodusteaduslike meetoditega põhjalikumalt uurida.