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PREFACE

My personal development into a building archaeologist and a researcher of walls probably began in 1968 when, together with my father, I saw the excavations of the ruins of the medieval Dominican convent of Turku. This interest took a more serious turn in the early 1980s when I began to study history and archaeology at the University of Turku. My final choice of medieval studies and building archaeology came in 1986, when I presented my graduate thesis on the stone buildings of medieval manorial castles. The route to this area of inquiry was pointed out to me by Pentti Virrankoski, Professor of History at the University of Turku, and through him a path opened up into the world of the Middle Ages. Since my early stages, I have had the honour of being guided by Docent Knut Drake and State Archaeologist Carl Jacob Gardberg. I also received significant support from Ms. Toini Grönqvist.

In 1985 I was given the opportunity of participating in various medieval field projects in Turku organized by the Turku Provincial Museum. Through this work the masonry houses and lost streets of medieval Turku became familiar to me. During those years I had the honour of working with archaeologists such as Heljä Brusila, Marita Kykyri and Aki Pihlman at various sites. Basing on this research, I first prepared a study on stone cellars in 1989, followed by a licentiate study in 1991 on the medieval town hall of Turku. These studies were supervised by professors Jussi T. Lappalainen and Unto Salo.

In the early 1990s medieval castles became my area of work and research. I began work as a building archaeologist at Kuusisto Castle in 1990 and in 1991 I joined the Turku Castle project funded by the Academy of Finland. The many years of collaboration with researchers Antti Suna and Leena Venhe and the architect Sakari Mentu have been particularly important to me. The repairs and renovation of Kuusisto Castle have given me an excellent opportunity to study medieval building methods together with bricklayer Matti Alanen and master-builder Jari Venhe. Researcher Jan-Erik Wahlberg and I have had many interesting discussions about the joint potential of archaeology and geology.

Over the years I have had fruitful discussions on building archaeology and kind support from State Archaeologist Henrik Lilius and departmental chief Pekka Kärki, superintendent Elias Härö and researcher Lasse Laaksonen of the National Board of Antiquities. Ten years of excavation and research at Laukko Manor in Vesilahti have offered a great many challenges and my discussions with Mr Juhani Lagerstam, owner of the manor, have been very useful.

Since 1994 I have had the opportunity on my part to study and develop Aboa Vetus & Ars Nova, a museum complex in Turku including a museum of medieval history. In collaboration with museum director Minna Sartes I have been able to explore the possibilities boundaries of contemporary research methods, for example in the fascinating new world of virtual archaeology. Various tasks and duties shared with conservators Tapio Hiltunen, Mirja Kanerva and Jorma Reilander have been truly rewarding and they have opened up perspectives not only on masonry construction but also the world of old paintings.

The various stages of the present research have been kindly supervised by Docent Knut Drake, head of the Turku Castle project. I have also received valuable advice from Docent Markus Hiekkanen and professors Jussi T. Lappalainen and Jussi-Pekka Taavitsainen. I have also benefited from rewarding discussions with Docent Högne Jungner, Docent Terttu Lempiäinen, Mr Pentti Zetterberg, Lic.Phil., and Ms. Päivi Luppi, M.A. In the preliminary inspection of the present work Dr. Christian Lovén present many comments on the research. The manuscript was translated into English by Mr Jüri Kokkonen, M.A. The artist Aaja Peura instructed me in the layout of the book.

The present research was carried out for a period of 16 months with funding from the Academy of Finland. I have also received funding for work in building archaeology from the Finnish Building Culture Foundation and the Matti Koivurinta Foundation. I am honoured to have this book published in the series of the Finnish Society for Medieval Archaeology.

The support of my parents and family has been invaluable during the long research process. For this I extend my warmest thanks to my parents, Raimo and Anneli Uotila, to my wife Mirja and to my daughters Eveliina, Susanna and Johanna.

Kuusisto 28 June 1998

Kari Uotila

1. INTRODUCTION

Medieval castles of stone were originally building complexes of several components, and a dwelling environment for many people. The chatelains and knights lived in the sumptuous stonebuilt chambers of the main castles, while everyday life in the castle complex largely focused on the margins - in the outer bailey area. The maintenance and upkeep of the castles was carried out in the shelter of the low outlying walls. It was here that the craftsmen's workshops were located. Some of the wards of the outer bailey areas were gardens for growing cabbages or herbs.[1]

Research into the history of the outer bailey areas of medieval castles is necessary because they can be investigated through various archaeological, historical and scientific methods. New results concerning the outer baileys help to date other parts and components of castles, and they provide new information on the construction of castles in Finland.

Outer baileys are a particularly promising subject of study in view of medieval masonry construction, because in quite many cases they were the only part of the castle that was built on clayey soil. The log frameworks and posts have thus been preserved so well that precise dendrochronological results can be obtained. These scientific dates have no connections with the earlier research tradition and they do not suffer from the long chains of circular reasoning often associated with earlier studies.

Owing to new and more precise dates, we can now primarily study the construction of medieval castles, and the results can be applied more broadly to studies of medieval architectural culture in Finland.[2] Discussion on this theme and on stone construction in particular has come under way during the 1990s. In 1994 Markus Hiekkanen published his doctoral dissertation on Finland's medieval stone churches. This contribution seriously questioned existing views of the chronology of medieval construction in stone and its links with the historical context.[3] According to Hiekkanen's results, the stone churches of the Finnish mainland were built at a relatively fast pace as late as the 15th century.[4]

A recent research project directed by Åsa Ringbom has investigated stone churches in the Åland Islands, arriving at the conclusion that the churches in this region are older than hitherto assumed.[5] The methods of Hiekkanen and Ringbom differ and their results are conflicting.[6] For example, Henrik Lilius has pointed to the problem of two different views on the subject. As a solution, Lilius proposes greater detail in studies on churches.[7]

New results have also been presented by Knut Drake, who has suggested that almost all medieval construction work in Finland is to be dated to as late as the 15th century.[8] Drake has reinvestigated the architectural history of Hämeenlinna Castle, dating the construction mainly to the 15th century, i.e. roughly one hundred years later than previously suggested.[9]

In his recent studies C.J. Gardberg has convincingly shown that hillforts of a certain type, previously dated to the 12th and 13th centuries, were in fact erected in the latter half of the 14th century under the "German-type" administration of King Albrecht of Mecklenburg. [10]

Medieval building archaeology and architectural history in Finland is currently an an active stage in which new fruitful approaches are being sought.

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[1] Examples of recent studies on medieval castles include: Andersson H. 1989; Biller 1998; Carlsson 1993; Drake 1993; Eriksson 1995; Hinton 1993; Josephson & Mogren 1996; Lind et al. 1997; Kenyon 1990; Lovén 1996; McNeill 1996; Mogren & Wienberg 1995; Nordeide 1997; Olsen 1992; Pounds 199 Ramqvist 1996; Törnblom 1996.

[2] The present state of medieval studies in Finland is discussed in Engman 1994 and Manninen 1995 as well as in Kallioinen 1995a, pp. 3-12. On medieval archaeology, see e.g. Drake 1994b, pp. 642-647; Ersgård et al. 1992.

[3] Following Iikka Kronqvist`s studies in the 1930-40s it has been maintained, that the stone churches of the Finnish mainland were built between the late 13th and the early 16th century (Kronqvist 1948a, pp. 7-80).

[4] Hiekkanen 1994. Hiekkanen has continued his studies of medieval churches and has published several articles, e.g. Hiekkanen 1995; Hiekkanen 1996; Hiekkanen 1997a, pp. 64-68; Hiekkanen 1997b and Hiekkanen 1998, pp 142-144.
Markus Hiekkanen's new chronological results have been accepted, for example, in a recent major work on ecclesiastical history in Finland (Heininen & Heikkilä 1996, pp. 37-38). See also Gardberg 1996, pp. 227-228; Orrman 1997, pp. 53; Palola 1997, pp. 210-218; Vilkuna 1998, p. 178.

[5] E.g. Ringbom 1993; Ringbom 1994; Ringbom & Remmer 1995, pp. 161-164, 262-273; Ringbom 1997.

[6] E.g. Gustavsson 1994 p. 508; Knapas 1997, p. 17-18.

[7] Lilius 1996, pp. 224-227; Lilius 1998, pp. 54-56.

[8] E.g. Drake 1996b. This brief contribution by Drake for a popular scientific magazine is perhaps not formulated in scholarly terms, and its purpose may have been to arouse discussion. See also Lilius 1996, p. 227.

[9] Drake 1998.

[10] Gardberg 1994, pp. 574-592.

The present study begins with the introductory chapter first delimits the theme at hand to the Middle Ages and more precisely to the period from the turn of the 13th and 14th centuries to the 1520s. The selection of the seven large castles investigated in this study is also discussed. Next I discuss bailey-related terminology, the available archaeological and historical material, and the various research methods. Chapter 2. explores in further detail the history of research at Turku Castle and the available material.

The study proper is in three sections, of which the first part is on the construction of the outer bailey of Turku Castle (*Swedish Åbo slott)*. This is discussed further in Chapters 3, 4 and 5. The study progresses via the various components of the outer bailey and interpretations of them. The documentation of observations is based on the text and archive collections of maps and plans, comprising the main cartographic material (Chapters 3 and 4).

The procedure is to first establish the internal chronology of the object of study, followed by the external chronology, or dating (Chapter 5). Where possible, dating is based on methods that are separate from the historical frame of reference (dendrochronology, radiocarbon, archaeology, building archaeology), thus providing dates that are as reliable and independent as possible for the stages of the outer bailey. It is only this dating result, obtained via archaeological and scientific methods, that is placed in the historical frame of reference, which is very limited with regard to the architecture and construction of outer baileys in Finland. This synthesis of the construction of the whole outer bailey of Turku Castle is presented at the end of Chapter 5.

The second part of the study discusses the outer bailey structures of the castles of Kuusisto (*Sw. Kustö)*, Häme (Hämeenlinna; *Sw. Tavastehus*), Viipuri (*Sw. Viborg)*, Raasepori (*Sw. Raseborg)*, Kastelholm (*Fi. Kastelholma)* and Olavinlinna (*Sw. Olofsborg)*. The methods employed vary according to site, and where possible I present earlier views, comparing them to building-archaeological data. I seek to date the internal order of construction as accurately as possible by applying different methods. At the end of each main chapter is a summary of observations pertaining to the castles in question.

The third section compiles researched information on the castles. Chapter 12 first discusses the two chronological stages of outer bailey construction in the Middle Ages and then compares various forms of buildings and components with the whole Finnish material, and where possible with the construction of outer baileys throughout the Baltic region. Chapter 12 describes the nature of outer bailey structures, their locations and time of construction.

Chapter 13 reviews the background factors in the construction of outer baileys and their significance for the construction work itself and the later life-span of the outer bailey. Chapter 14 summarizes the main results of the study. It also discusses the construction of outer baileys as part of the architectural culture of medieval Finland.

The appendices contain the plans of the outer bailey of Turku Castle (Appendix 1) and plans of the outer baileys of Kuusisto Castle (Appendix 2).

1.1. The Subject of Study

The study is limited to outer bailey structures primarily for practical reasons. It is part of a broader research project on Turku Castle, in which each researcher has been responsible for a distinct theme providing information for the whole project. My study focuses on the outer baileys because Dr. Knut Drake, head of the project, has studied the history of the main part of Turku Castle. The objective here has been to review intermeshing themes.[1]

Turku Castle provides good opportunities for investigating medieval outer bailey structures. Repairs of the outer bailey from the late 1950s to the 1970s and related fieldwork have revealed a great deal of new archaeological material.[2]

In addition to Turku Castle, I have also investigated all the outer baileys of Finnish castles built during the Middle Ages (in Finland ca. 1150-1520) of which archaeological or historical data survive.[3] The main focus of study is on Turku Castle, and the other castles are treated as comparative material. Restricting the material to seven large castles (Turku, Kuusisto, Hämeenlinna, Viipuri, Raasepori, Kastelholm and Olavinlinna) is

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[1] Drake 1993b, pp. 15-17.

[2] Kajala 1993, pp. 28-31.

[3] Outer baileys of this type were rare defensive structures in medieval Sweden, whereas they were associated with all the larger castles of Finland (see Lovén 1996, pp. 57-180, 236-266, 276-347).

Our idea of the distribution of the outer baileys can be skewed by at least two factors. The first is extensive construction of castles in the 16th-18th centuries, in which connection the old wall structures were completely covered over by the new components. The second aspect is that the archaeological research of castles varies greatly and that the outer baileys are in most cases the least studied areas. It is possible that the extensive construction of outer baileys in Finnish castles was not exceptional and that the corresponding structures in Sweden have either been completely destroyed or still remain to be excavated.

Fig. 1. The medieval castles of the present study. (drawing by K. Uotila).

due to the lack of definitely identified outer bailey structures at other castles (Fig. 1). [1]

Smaller castles and fortifications are for example Korsholm[2], Liinmaa at Eurajoki[3] and Iso Linnavuori at Porvoo[4], but there is no archaeological information on their components. Also excluded from the present study is a large group of prehistoric or historic hillforts, such as Vanhalinna in Lieto[5] and Hakoinen in Janakkala[6], where the historical dates of structures are uncertain.

Delimiting the period of outer bailey construction to the Middle Ages (i.e. from the turn of the 13th and 14th centuries to the 1520s) proceeds from the subject itself. The turn of the 13th and 14th centuries is a distinct initial stage in the building of both medieval castles and their outer baileys. There are grounds for placing the chronological limit in the 1520s and the ascendancy of King Gustavus Vasa. At this stage extensive new construction works came under way in some of the castles, covering and overlaying the medieval sections. Some of the castles, in turn, remained beyond the sphere of centralized royal administration. They either fell into disrepair (Raasepori) or were torn down (Kuusisto).

The defensive function of the outer baileys changed during the first half of the 16th century. An essential aspect of medieval castle architecture was the protection provided by high walls. This principle began to change during the 16th century. The defence of the castle was taken down to ground level and further away from the castle itself. The stone walls began to be replaced with walls of earth.[7]

In terms of source material, there is also a clear boundary between medieval and 16th-century bailey construction. Medieval baileys can mainly be studied with archaeological means, whereas the

[1] E.g. Drake 1985a, p. 137; Gardberg 1987, pp. 37-47; Gardberg 1993a; Sinisalo 1987, pp. 102-116.
[2] Gardberg 1993a, pp. 105-107, Gardberg 1996 pp. 167-168.
[3] On Liinmaa Castle at Eurajoki, e.g. Luoto 1987, pp. 59-76.
[4] Gardberg 1996, pp. 155-170.
[5] Luoto 1984.
[6] Rinne 1914, pp. 143-168. A discussion on the Hakoinen hillfort and its historical stages is currently in progress (e.g. Lovén 1996, pp. 62-64; Taavitsainen 1990, p. 236).

[7] E.g. Gardberg 1993a, pp. 13-17 and Sinisalo 1987, pp. 106-107.

16th century introduces a growing number of written historical sources.[1]

The medieval chronological perspective is also called for in view of the history of research concerning Turku Castle. There have been studies on the later stages of the bailey, for example Carl Jacob Gardberg's 1959 work on Turku Castle in the 16th century and Sari Jussila's later research on the eastern outer bailey during the 17th century.[2]

1.2. Bailey-related Terminology

The word "bailey" and related terms are used in different ways in the research literature. For example, the courtyards of castles are sometimes referred to as outer baileys, outer wards or outer works. The present study proceeds from the terms used in Finnish and Swedish in connection with the individual castles, which have become established in research literature or in on-site field work.[3]

The prime term is " outer bailey" (Fi. esilinna), which can be defined as a walled courtyard in a clearly subordinate position to the main part or body of the castle.[4] There was a distinct and visible difference between the main castle and the outer bailey, distinguished by the height of the walls and towers. Moreover, the buildings in the outer bailey area were unassuming. The palace, or residence of the master of the castle was always situated in the main castle. In addition, it was possible to control and if necessary fire upon the outer bailey from the main castle.[5]

There are a number of problems in defining the outer bailey as a term in the present context. Firstly, research shows that in some of the oldest castles of Finland (of the 13th and 14th centuries) the courtyard or ward was divided into two areas. One part of the ward served dwelling purposes while the other part was a yard related to the household economy of the castle. The latter ward area has been termed the bailey in studies, although it was not distinguished structurally from the main castle.[6] This idea follows from the assumption that the area of the castle was gradually taken up and the castle itself was enlarged in stages.[7] I proceed from the concept that the term bailey here implies only those walled ward areas that can clearly be distinguished from the main castle. The changes and development of spatial divisions within the inner ward or courtyard of the main castle are not considered in this study.

A further problem concerns the term forecourt or outer ward (Fi. esipiha) as used in the research literature. In early studies on Turku Castle, this term has been used of the works located south of the castle. According to Gardberg, the term denotes a distinction, dating from the 16th century, between the out bailey proper and the forecourts.[8] The term forecourt or outer ward has generally been used in referring to outer baileys with surviving low walls but no stone buildings or structures.[9] This term is perhaps misleading, for the walls of the baileys could have become lower only centuries after construction, and there may be stone structures awaiting excavation below present ground level.[10] European research literature, particularly in Germany, divides the outer baileys into two groups. The outer bailey proper (Ger. *Vorburg*) does not encircle the main castle , but is located separately at the side as an independent part of the castle complex, very often containing auxiliary buildings

[1] Surviving written sources tell only rarely of the construction of medieval castles, and even more rarely of the bailey. On research in Finland, see e.g. Hackman 1944, pp. 60-61; Hausen 1881, pp. 12-45, I-VI; Snellman 1891, pp. 6-7; Törnblom 1996, p. 11. On Swedish studies, see e.g. Mogren 1995, pp. 173-174.

Owing to King Gustavus Vasa's reforms of administration, the stages of building baileys in the 16th century are known much better. E.g. Gardberg 1959, pp. 148-153, 303-307, 386-388, 427-438; Hackman 1944, pp. 64-82; Snellman 1891, pp. 9-30; Vilkuna 1998, pp. 173-178.

[2] Gardberg 1959 and Jussila 1994.

[3] On these grounds, for example the southern middle outer ward of Turku Castle is known as the "smithy ward" and Hämeenlinna Castle has several baileys, although there is in fact only one large complex. I have avoided inventing new names for outer baileys that have already been given names. I have chosen to do so because the research material for each castle is filed under the adopted names and designations in the archives concerned.

[4] In the English research tradition, the term 'outer bailey' refers to the outer part of a castle complex through which there is access to the main part or inner bailey. Other outer structures can be given terms such as 'court ward' (Dr Richard Fawcett, personal communication, Chateau Gaillard XIX in Graz 27.8.1998). It is however difficult to establish terminology on the basis of routes of access, because the routes could have changed during the Middle Ages.

[5] Cf. Lovén 1996, p. 31.

[6] E.g. Drake 1994a, pp. 54-55; Gardberg 1993a, pp. 28-29; Rinne 1938, pp. 323-327. The concept of dividing the courtyard of the main castle in two parts can be seen in Turku Castle.

[7] This is most clearly shown by Rinne's interpretation of the history of Turku Castle. Rinne 1938, pp. 323-327.

[8] Gardberg 1959, pp. 45-51.

[9] E.g. Gardberg 1993a, pp. 46-47.

[10] According to a large number of paintings and drawings, there was a high bailey wall on the south side of Turku Castle as late as the 1830s. The wall was torn down by the next decade. The high bailey on the south side is particularly evident in a painting by Thomas Legler from the 1830s (Collections of the Turku Provincial Museum TMM: no 4070; partial enlargement of the painting in Gardberg 1993a, p. 11).

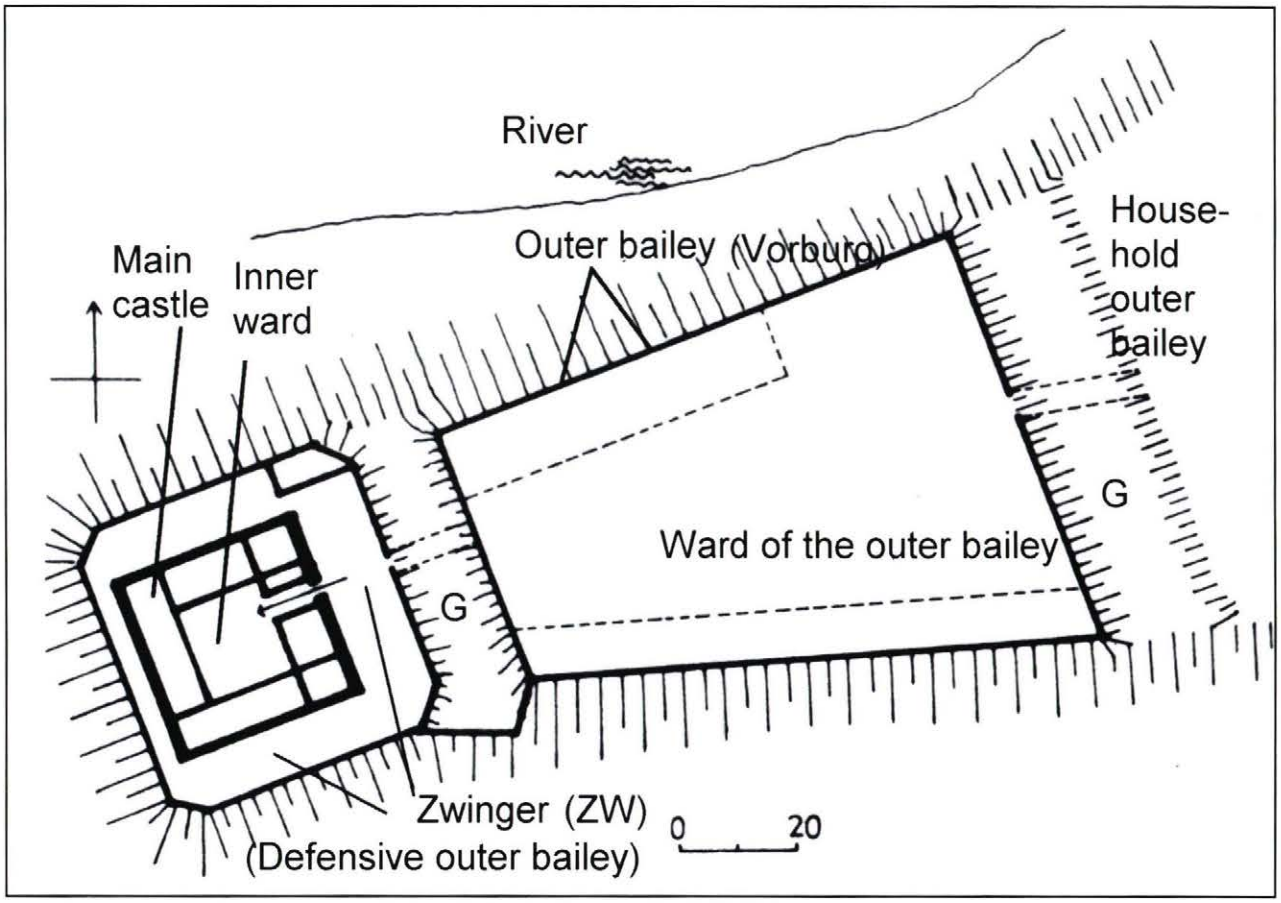

Fig. 2. A castle of the Teutonic Order (Leipe in present-day Poland), consisting of a main castle, outer bailey and defensive outer bailey. Access to the main castle was via the moat (G), outer bailey (Vorburg), moat (G) and Zwinger (ZW). The outer bailey, which was clearly larger than the main castle was located apart and next to the main castle, and there were buildings within its walls. The main castle was surrounded on all sides by a narrow Zwinger (or defensive outer bailey) that lacked towers and houses. (Source: Krahe 1994, pp. 50 and 702. Redrawn by K. Uotila).

of stone or wood. The second group consists of outer bailey areas or outer wards (Ger. *Zwinger*) as narrow defensive structures around the main castle.[1] Originally these did not contain buildings. These *Zwingers* (or defensive outer wards/baileys) often had a ward area sloping steeply down to the outer wall. The sloping ward also served defensive purposes.[2] The various types of wards and baileys are defined in this study by following the German terminology. Here the term "outer bailey" corresponds to the *Vorburg* and the defensive outer bailey corresponds to the *Zwinger* (Fig. 2).[3]

The terms "motte and bailey" figure in West European studies, referring to earthworks and a tower within them (motte) and an adjoining larger ward area with earthwork walls.[4] In the Nordic countries a similar combination of an actual defensive castle and a large ward area is termed "Castrum-Curia".[5] In principle, the concepts of the West European bailey or curia match the baileys of the large castles of Finland, as their function was largely the same.

The corresponding term in Finnish studies, *talousesilinna*, can be roughly translated as household or maintenance outer bailey. It implies an area for serving the household needs of the castle, a kind of large ward or farmyard. For example, at Raasepori Castle Knut Drake has distinguished the outer wards surrounding the main castle and the

[1] In Central Europe the term '*Zwinger*' is used only of those narrow outer bailey through which there was access to the main part (Prof. Dr Werner Meyer, personal communication Chateau Gaillard XIX in Graz 27.8.1998).

[2] On the use of the terms *Vorburg* and *Zwinger*, See e.g. Biller 1998, p. 204-205; Guerquin 1984, pp. 99-344; Krahe 1994, pp. 50, 692-715; Tuulse 1942, pp. 166-180.

[3] The term "defensive bailey" has been previously used of the baileys of Raasepori Castle. Drake 1991, p. 114.

[4] E.g. Clarke 1984, pp. 105-112; Kenyon 1990, pp. 9-38; Pounds 1994, pp. 11-25; Stiesdal 1984, p. 36.

[5] In castles of the Castrum-Curia type there was a divided complex with a large courtyard (*curia*) surrounded by moats and more securely fortified timber or brick tower (*castrum*). In some cases there was a farm (*curia*) located apart from the castle (Stiesdahl 1976; 1984 pp. 37-38). On definitions of the term, see Lovén 1996, p. 35. On Castrum-Curia type castles in Sweden, see Ekre 1992, p. 117; Mogren & Svensson 1988, pp. 163-165.

"household or maintenance outer baileys" on nearby hillocks, connected to a small trading settlement in the area.[1]

The "household outer bailey" is generally assumed to have been near the castle itself (at a distance of 500-1,000 metres) and located apart from the defensive zone of the castle, which meant that it was of minor defensive importance at least for the castle.[2] There have been very few archaeological investigations of the "household outer baileys" of Finnish castles, and there is extremely little archaeological data on their architectural history or dating. The household outer baileys are discussed in the present study in cases where definite archaeological or historical results are available.

1.3. Problems of Study

This study proceeds from the idea that in the Finnish context the outer bailey with its walls and towers formed the outermost masonry-built defensive works of the medieval castle. It played an important role in the defence of the castle and in warfare. The review of the material is limited to masonry built structures. The household or economic activities of the ward areas are not discussed at any length here, since this theme is currently being studied in the Turku Castle project by the archaeologists Marita Kykyri and Aki Pihlman.[3]

The primary aim of this study is to establish the structures of the various parts of the outer bailey of Turku Castle, their order of construction and age. Secondly, I review in broader perspective the medieval outer baileys of all medieval castles in Finland. Also presented in this connection is a history of research concerning castles in Finland.

My third objective is to outline the postconstructional history of the outer baileys, which were often built close to the shoreline. Of special interest is the correlation of the wall structures with earlier researched information on the water levels of the Baltic. This also involves the problem of the influence of natural conditions on construction and use.

The fourth perspective of the present study is to investigate whether a connection can be made between the development of artillery in the Middle Ages and the building of outer baileys. Were the outer baileys built to protect the actual castle from artillery fire? Related to this question is the problem of how castles built before the invention of artillery fared with the development of armament technology.

The fifth consideration concerns the connections of castle building with the political, military and economic background of the Middle Ages.[4] My purpose is to investigate, via these questions, the underlying reasons for building outer baileys, first at individual castles and then in broader perspective in Finland and in the Swedish Realm in general.

1.4. The Material

This study is primarily concerned with Turku Castle and the other castles discussed here (Kuusisto, Hämeenlinna, Viipuri, Raasepori, Kastelholm and Olavinlinna) are treated as comparative material. One of the reasons for limiting the theme to Turku Castle is that a distinct delimiting of the subject made it possible to complete the work.[5]

A further, and more important, reason is that an investigation of precise structural details is only possible in the case of Turku and Kuusisto. The research material for the castles of Viipuri, Hämeenlinna, Raasepori and Olavinlinna is either unorganized or only partly preserved, or available to study with only great difficulty. In the case of Kastelholm there is no reason to doubt the systematic recording of material, but the present study is limited to the research literature for reasons of organization[6].

The historical and archaeological data on the outer baileys of all the castles are included in the study. This means that not all newspaper articles and guidebooks are included. Moreover, most works on local history have been excluded, because they

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[1] Drake 1991, pp. 90-92, 119-127.

[2] The "household baileys" were not only a part of large castles, but were also found on larger manorial estates, in Finland, such as Laukko at Vesilahti. See e.g. Jokipii 1955, pp. 76-83 and Uotila 1996, p. 145

[3] Kykyri 1994, pp. 81-88, Pihlman 1994 A., pp. 70-79.

[4] The earlier tradition of research stresses that late-15th-century castle building in Finland resulted from external threats. E.g. Drake 1985a, p. 137; Gardberg 1993a pp. 70-71, 109; Sinisalo 1987, p. 102.

This subject has recently been discussed by Lena Törnblom, who maintains that it is mistaken to link the construction of castles directly to the threat of Denmark and Russia. She claims that the building of castles by the Tott brothers was largely associated with defending their own position on the domestic scene. Törnblom 1992, pp. 390-393 and Törnblom 1996, pp. 61-62. Cf. Härö 1997, pp. 31-42.

[5] This study was funded by the Academy of Finland for a period of ca. 1.5 years, which means that in addition to the castles of Turku and Kuusisto it was not possible to investigate the research archives of other castles.

[6] On the extensive material on Kastelholm, see e.g. Carlsson 1993; Palamarz E. & Palamarz P. 1992 and 1993.

mostly repeat and reiterate the views expressed in earlier studies.[1]

It is difficult to draw a line between scholarly research and general works on castles. Very few castles in Finland have been the subject of proper research. Most of the views of researchers have been presented in brochures and general works of varying standard.[2] Presenting results or interpretations in a less restricted popular format is not specific to Finnish research; for example in Sweden, the situation is quite similar.[3] Included in the research material are the main general works of Finnish history and art history on castles.[4]

In addition to a variety of archaeological materials, there are also historical sources concerning the outer baileys of castles. In addition to a few medieval sources, information on the structures of the outer baileys is also given, for example, in maps and paintings of the 17th-19th centuries[5] (Figs. 8 and 9).

The construction of outer baileys in the Baltic regions is reviewed with reference to the research literature, and my specific focus is on recent archaeological and historical research. It should be pointed out, however, that the outer baileys have played only a minor role in architectural history also in other parts of the Baltic regions. For example dates given in the literature are mainly based on art-historical comparisons or the architectural history of the main part of the castle in question. Therefore, the research material is not comparable in all respects with the data considered in the present study.

1.5. Methods

The guiding concept of this study is to investigate the stages of construction of a medieval castle mainly on the basis of so-called building archaeological material. The first task is to establish what kind of outer bailey structures have been found, after which it is attempted to assign dates to the various components and whole outer baileys with the aid of archaeological, scientific and historical methods. Following the dating, I review the historical contacts and background factors of the construction of the outer baileys. In doing so, I seek to separate the historical framework from the dating *per se*, thus keeping the archaeological dating separate from the problem of circular reasoning that is closely associated with historical archaeology[6].

The methods applied here consist of normal research employing written historical sources and critical assessments of earlier studies. It is clear, however, that with a theme of this kind the main emphasis will be on the methods of historical archaeology. I have applied the means of building archaeology to analyse the material of previous field work and for my own observations at Turku Castle and Kuusisto Castle. At Turku, my own field observations have been limited by the museum currently operating in the outer bailey.

Building archaeology

The dating of masonry structures with the methods of building archaeology has been one of the main aspects of medieval archaeology for a long time, although no general work on this subject has appeared in the Finnish language. Even on the international scene the presentation of methods has often been outshadowed by the actual results.[7]

As a term, building archaeology mainly refers to archaeological research in which excavation of the soil or the dismantling of walls provides data, for example, on the history of a building. Building archaeology proceeds from the observable construction stages of the object of study and the stratigraphy of its surroundings[8]. Once the internal chronology of the site or object has been established, it is placed in its specific chronological framework via building-archaeological methods, historical sources, scientific dating, and archaeological artefact dating.[9]

During the 20th century, the building-archaeological dating method relying on structures has developed in Finland mostly through contacts

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[1] Cf. Carlsson 1993, pp. 30-41

[2] The nature of Finnish research literature on castles is demonstrated for example in Gardberg 1993a, pp. 142-143. Most of the literature consists of various guide-books.

[3] E.g. the history of Läckö castle: Lovén 1996, pp. 236-239 and Sigsjö 1988, pp. 142-153.

[4] E.g. Gardberg 1987, pp. 37-47 and 1993; Sinisalo 1987, pp. 102-115. See also Lovén 199

[5] The use of maps and paintings of the 17th-19th centuries suffers from the fact that most of the castles were repaired or enlarged after the Middle Ages, before the emergence of different historical materials. Therefore it is very difficult to distinguish medieval construction from later works in the maps and paintings.

[6] On the problem of circular reasoning, see e.g. Lilius 1971a.

[7] On research literature in building archaeology, see e.g. Andersson K.& Hildebrant 1988; Eriksdotter 1997, pp. 741-761; Gardberg 1958; Hiekkanen 1994, pp. 214-215; Malm 1992; Rodwell 1989, pp. 62-84; Sundner 1986, pp. 199-213, Sundner 1997 pp. 73-90.

[8] Cf. Lindberg 1975, p. 121, 136, note 188.

[9] E.g. Lilius 1971a.

with other Nordic countries.[1] The tradition of research has established a picture of what kind of stone and brick structures were in use in the Middle Ages.[2] Moreover, experts have for decades dated some of the bricks found in structures to the Middle Ages with reference to size, colour, firing and paste.[3]

In my opinion, these traditional methods can be used for example to give an object a broad date to the Middle Ages (ca. 1200/1300 — 16th century). However, a more precise dating, for instance within 30 years to the beginning of the 15th century is no longer possible with reference to brick size or the Flemish bond.

In Finland, medieval bricklaying methods survived for centuries with little change, and minor structural differences are more an indication of different builders than of chronology. Major changes in building methods did not occur in Finland or even in Sweden until the 16th century, and partly in the 17th century.[4]

Building archaeology is also concerned with the problem of medieval building methods and practices. In Finland, Markus Hiekkanen's recent studies have fanned debate in this area. According to Hiekkanen a medieval stone church could have been built to completion in only a few years.[5]

Research has also progressed in other areas, as extensive repairs and renovation have provided a great deal of researched information on medieval buildings and their later stages.[6]

Archaeology

The closest partner of the building archaeologist is naturally the archaeologist, investigating strata and capable of establishing the history of layers and structures in connection with walls. Finds of coins or other objects permit the dating of layers beneath walls or adjacent to them.

In practice, it is often very difficult, if not impossible, to apply artefacts in dating. Firstly, this is due to the fact that the soil layers near walls are often mixed and their stratigraphy is disturbed. Secondly, until recent years most of the archaeological excavations of outer baileys have been technical excavations or the mechanized removal of soil. There are very few areas excavated in natural layers, which particularly leads to the problem that the specific relation between finds and structures often remains unclear.[7]

Historical studies

It is always extremely difficult to apply medieval written sources in building archaeology, as the linking of documentary sources to specific buildings or certain stages in their history has often proven to be mistaken.[8] However, even the limited source material available in Finland can provide valuable and comprehensive information on many areas of life in the Middle Ages.[9] It is, however, an undeniable fact that written sources provide very little information for the study of buildings and the everyday life associated with them.[10]

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[1] There was discussion on the problems of dating in building archaeology in Finland already in the early 1970s (Drake 1971 and 1972; Lilius 1971a and 1971b). Discussion following Hiekkanen's recent research has taken up some of these themes (e.g. Lilius 1996, pp. 224-227; Lilius 1998, pp. 54-56; Hiekkanen 1997a, pp. 64-68).

[2] For the Flemish bond (also known as flemish double-stretcher bond) - two bricks lengthwise and one crosswise - *(in Swedish* munkförband *and in Finnish* munkkilimitys*)* has been regarded as a typical medieval building method, as also the regular and careful masonry work of walls of natural stone, in which the stones are of highly regular size and are placed in distinct rows.

[3] On the dating of various building details, see e.g. Andersson K.& Hildebrant 1988, pp. 36-200; Bengtsson 1982, pp. 9-25; Dahlbäck 1983, pp. 142-144; Gardberg 1958, p. 32 and Gardberg 1967, pp. 59-69; Luoto 1984 p. 128; Malm 1992, pp. 221-250; Sundner 1982, pp. 10-12; Rinne 1941, pp. 65-66; Rosborn 1973, p. 43 ; Rosborn 1986; Uotila 1986, pp. 51-63; Uotila 1989, pp. 42-57; Venhe 1994, pp. 33-34. See also Hiekkanen 1994, pp. 214-215 on the use of construction details in dating.

[4] E.g. Augustsson 1992; Bengtsson 1982, pp. 9-25; Uotila 1988, pp. 51-70 and Uotila 1996, pp. 130-147.

[5] The costs, duration and working methods of medieval construction (mainly churches) have again come under discussion in recent years (e.g. Hiekkanen 1994, pp 163-165 , 248-249, Lilius 1996, pp. 226; Orrman 1997, p. 53-57).

[6] Paatonen 1994, pp. 48-59; Parland 1994. Extensive research in this area is being conducted by the Finnish Association of Construction Engineers and the Chair of Building Statics of the Tampere University of Technology. Parland 1994, pp. 38-40. On recent developments in studying medieval mortar, see von Konow 1997.

[7] On the stratigraphical order of structures and earth layers, see Barker 1995, pp. 16-35, 91-99 and Carver 1987, pp. 15-19. On the use of coins for archaeological dating Barker 1995, pp. 205-206; Hiekkanen 1994, p. 215; Högfors 1991; Klackenberg 1992, pp. 43-44.

[8] On the linking of historical events to masonry construction see Drake 1994a, pp. 50-57; Gardberg 1995, pp. 120-123; Hiekkanen 1994, p. 213; Lilius 1996, pp. 226-227; Lovén 1996, p. 137; Ödman 1996, pp. 135-140 and Ödman 1997, pp. 10-40.

[9] On the new opportunities and methods of traditional historical studies, see Kallioinen 1995a.

[10] On the opportunities of using written sources in studying the history of castles, see e.g. Fritz 1989, pp. 21-32; Vilkuna 1998, pp. 23-27, 173-178.

Medieval clerks, for example, did not draw up lists of the various parts of castles or their function (at any rate such lists have not survived). The parts of the castles are mentioned in sources only when something of importance took place in them. Only when an important meeting was held, was a particular venue recorded in the available sources.[1]

In dealing with medieval sources we must also consider their chronological perspective, as considerably fewer sources of the 13th and 14th centuries have survived than from the 15th and 16th centuries.[2] The degree of preservation of available sources alone may influence the fact that the use of many buildings and castles does not seem to begin until the 15th century.

The medieval town hall of Turku is an example of a building that was in use for a long period. Its architectural history begins in the first half of the 14th century, but the written mentions of it in sources are from as late as the middle of the 15th century. This stone building had been the meeting place of the town council for at least a century before it was first mentioned in documentary sources. [3]

Owing to the lack of direct written sources, the history of castles has often been linked to the overall historical framework and to generally known events, such as wars. Studies in recent years have often focused on linking known commandants of castles with the various stages in the building and construction of castles.[4] Conclusions of this kind do not always find archaeological confirmation.

For many decades, building archaeologists and other researchers have awaited precise natural scientific dating methods that would be free of the humanistic research tradition and its compounded circular reasoning.[5] Problems of dating are perhaps more pronounced in building archaeology in Finland than elsewhere in Europe, for we have practically no unequivocal historical sources for establishing the age of buildings.[6] Elsewhere in Europe the history of buildings can well be traced in historical sources, which also puts building archaeology on a sounder footing.[7] Following the establishment of precise dates it is then possible to investigate the role of a castle or church with regard to economy, social aspects or the history of mentalities.[8]

Broad interpretations of this kind are rare in Finnish studies and they are bedevilled by the lack of precise dates and the contact of the phenomena with the historical framework.[9]

Scientific dating methods

In addition to new building-archaeological methods, the dating methods and techniques of the natural sciences also point a way out of circular reasoning. Dendrochronology, based on the growth rings of trees, has been most widely applied in the 1980s and 1990s. Another widely used method is dating based on the half-life of radioactive carbon, which can be applied to both organic materials and mortar. Introduced in 1995-1996 was the AMS method, which is closely related to the radiocarbon method. There have also been experiments with the thermoluminescence dating of brick.[10]

In the Finnish context, the problems of scientific dating have culminated in the radiocarbon dating of mortar. The opinions of scholars differ markedly on this issue.[11]

The starting point in this study is to deal with all the opportunities for dating that are available to research. Where possible, I also review all the chronological material associated with the castles, which consists of radiocarbon and dendrochronological dates.

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[1] For example, in July 1463 a meeting headed by the king convened at the cabbage field of Turku Castle. FMU IV nr 3207. See Gardberg 1959, p. 45 and Klockars 1979, p. 82.
It can of course be assumed that an important meeting was held at the outer bailey immediately after it was completed, in which connection its new buildings and structures could be presented.

[2] E.g. Broberg 1992, pp. 274-275.

[3] On the architectural history of the medieval town hall of Turku, see Uotila 1991 and also Drake 1992a, pp. 49-

[4] On the role of the historical framework and the chatelains in construction, see Drake 1993a, p. 33.

[5] E.g. Drake 1971 and 1972; Lilius 1971a and 1971b.

[6] Hiekkanen 1994, p. 213.

[7] Differences with regard to research in Central Europe are demonstrated by the small castle of Wenecja in Poland. Owing to research by Czeslaw Sikorski, the various stages of the castle are known to the nearest year, at best to within a few months. Sikorski 1986.

[8] With reference to Europe, see e.g. Hinton 1993, McNeill 1996 and Pounds 1994. In the Nordic countries, new research ideas have been presented at a few seminars, e.g. Josephson & Mogren 1996.

[9] On research into the broader economic context, see e.g. Drake 1985b, pp. 73-85, Drake 1989 and Drake 1996b.

[10] On scientific dating methods, see e.g. Hiekkanen 1994, pp. 215-217; Ringbom 1993, pp. 27-36; Ringbom & Remmer 1995, pp. 12-17 and Ringbom 1997.

[11] E.g. Hiekkanen 1997a, pp. 64-68 and Hiekkanen 1998, pp 142-144; Lilius 1996, pp. 224-227; Lilius 1998, pp. 54-56.

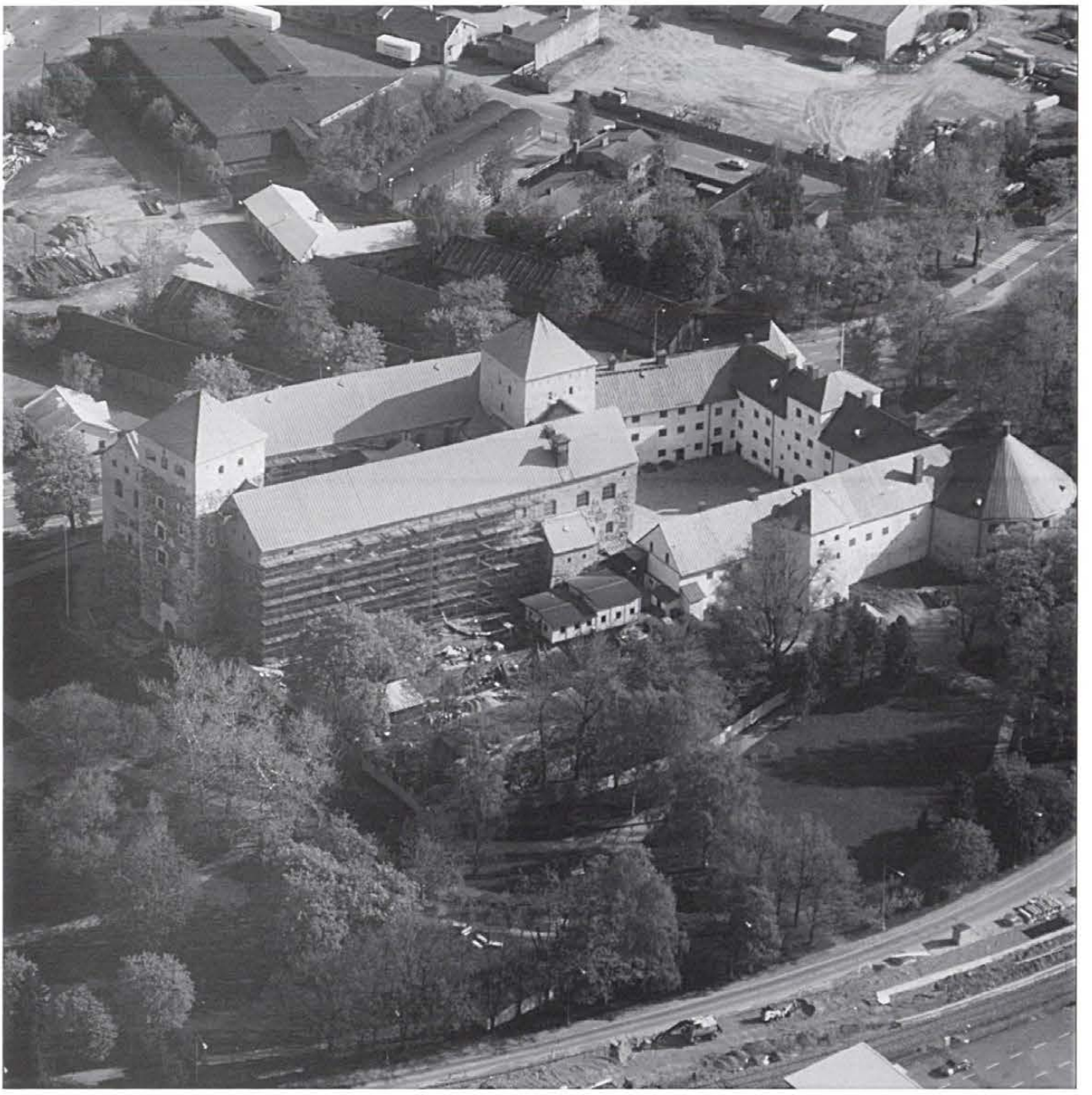

Fig. 3. Turku Castle (Sw. Åbo).
Turku Castle is mentioned in historical sources for the first time in 1308 together with the castles of Hämeenlinna and Viipuri, although its oldest stages are associated with a reference from the 1280s to one Carolus Gustav who had the title of "praefectus Finlandiae". In 1318 the Chronicle of Novgorod mentions the castle, and from 1324 to 1326 Matias Kettilmundsson maintained a luxurious court there. The castle's first major siege is associated with the ascendancy of Albrecht of Mecklenburg in 1365, in which connections it may have suffered considerable damage. The outer bailey is mentioned for the first time in historical sources in 1463, and sources from 1505-1507 mention the collapse of the wall next to the river and of the construction of a new wall. In the 16th century Turku Castle was involved more often in armed conflicts, first in 1520-21 and again in 1523, when King Gustavus Vasa of Sweden gained control of the castle and subsequently of all Finland. In 1556 the castle became the centre of the duchy ruled by Duke Johan and at the same time one of the castle's most active periods of construction came under way. Duke Johan's term came to an end in 1563, but the castle, and the outer bailey in particular, was actively built until the close of the 16th century. As late as the 1650s it was the residence of Governor-General Per Brahe, after which its role as the administrative centre of the country passed into history. The repairs and investigations of the castle began in the early 1900s. View from the southwest. (Photo P.O. Welin)

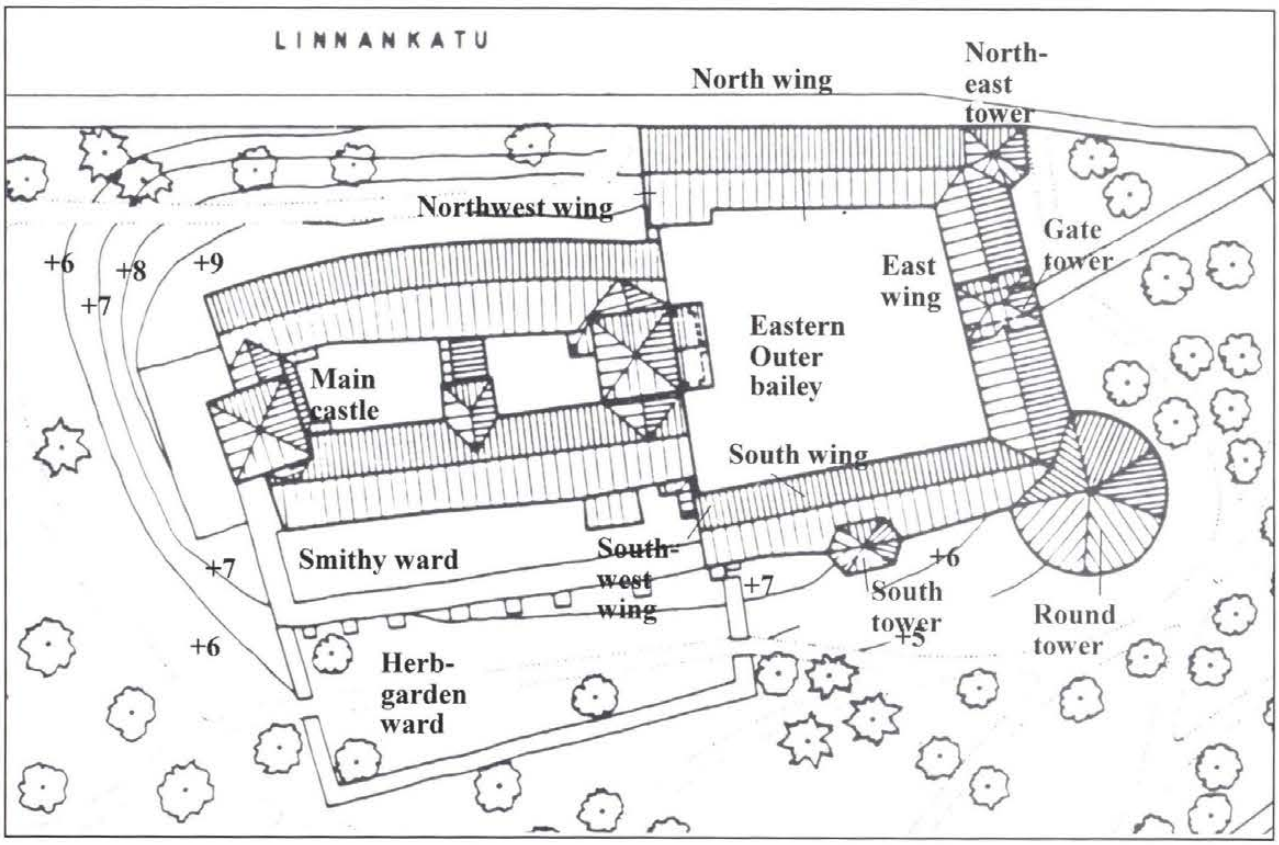

Fig. 4. Present-day Turku Castle consists of the main castle and the eastern outer bailey with its southwest, west, east, north and northwest wings. The outer bailey also has a hexagonal (south) tower, a round tower (overlaying the older southeast tower), and a northeast tower. On the south side of the main castle are two wards, the middle and outer southern wards, which are known as the smithy ward (the gaol ward) and the herb ward. (Gardberg 1959, pp. 31-33, map in the archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Redrawn by K. Uotila).

2. TURKU CASTLE

Turku Castle, located at the mouth of the River Aurajoki was originally built on a small island, which was still surrounded by a drying inlet of the sea in the 13th and 14th centuries. The medieval town of Turku was located roughly three kilometres upriver, and the oldest ecclesiastical centre of the river valley region - the Cathedral and Diocesan See of Koroinen - was situated some five kilometres upstream.

The main part of Turku Castle was built at the turn of the 13th and 14th centuries almost completely on bedrock and moraine. The eastern outer bailey and possibly its southern counterpart were partly built on bedrock and clayey soil (Fig. 3 and 4).

2.1. History of Research

Research in the history of Turku Castle came under way in the late 19th century, when it was mainly the interest of historians and architects planning restoration works. Already in the 18th and 19th centuries the value of Turku Castle as a cornerstone of Finnish history was widely recognized, but its actual history began to be sought in the 20th century through archaeological excavation and research concerning the walls.[1]

[1] E.g. Drake 1995, pp. 105-107; Gardberg 1959, pp. 13-30; Gardberg 1984, pp. 65-69; Gardberg 1993a, pp. 48-49.

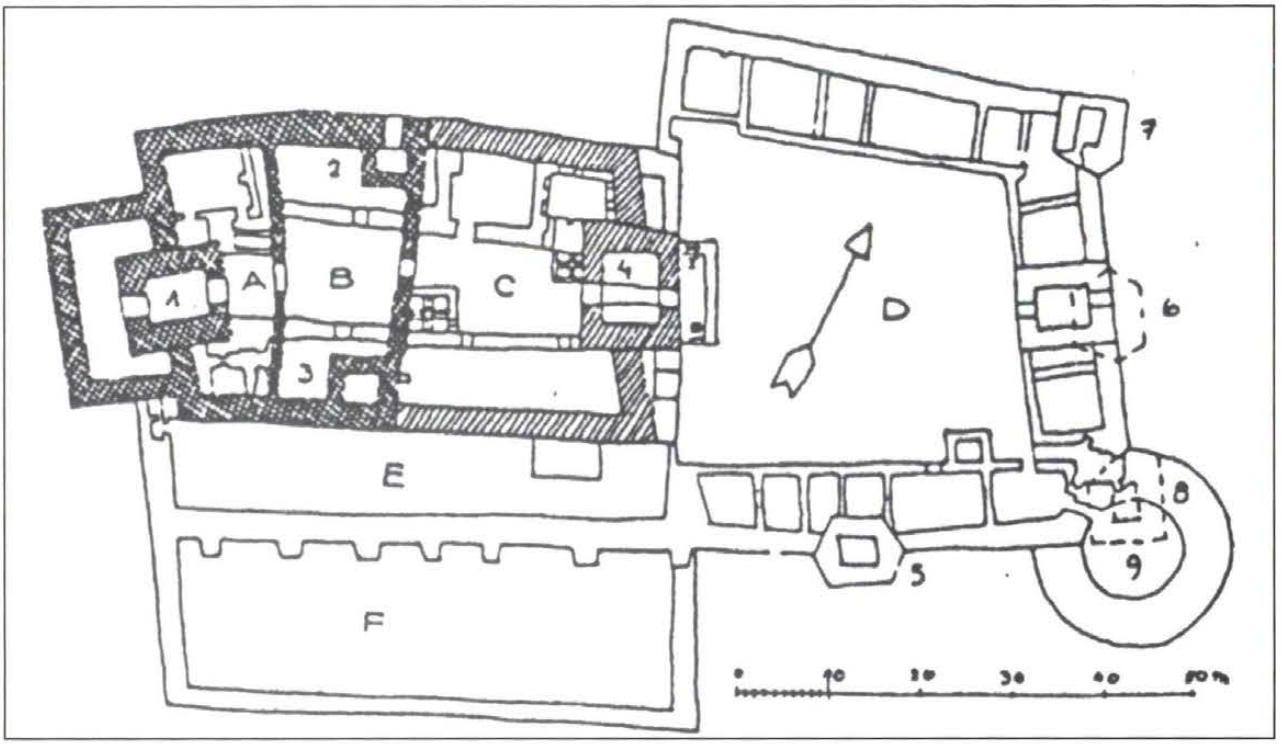

Fig. 5. Juhani Rinne's suggested order of construction of Turku Castle.
The outer bailey structures are numbered as follows: 5=the hexagonal tower of the south wing; 6=the masonry-built polygonal gate tower of the east wing; 7=the northeast tower; 8=the older southeast tower; 9=the round tower; E=the smithy ward, F=the herb ward. To the west of the west tower (1) of the main castle is the rectangular west outer ward. (Rinne 1938, p. 324).

Juhani Rinne

From the early years of the 20th century, the archaeologist Juhani Rinne was interested in the history of Turku Castle, and he touched upon its history of construction in his doctoral dissertation from 1914.[1]

Rinne, however, was mostly occupied with his research on Turku Cathedral, and it was not until 1929 that research at the castle could begin. Unfortunately, Rinne was never able to publish his extensive studies on the architectural history of Turku Castle.[2] The only comprehensive presentation of this subject is a brief article on the history of the castle written for a Finnish encyclopaedia in 1938 (Fig. 5).[3]

According to Rinne, the oldest stage of the castle, fom the late 13th century consisted of the western-most section of the present main part with the west tower as its centre.[4] East of the tower was a large walled courtyard and to the west a similarly walled smaller ward. In the central parts of the present main section was the oldest outer bailey with square towers at its northeast and southeast corners.

The castle was enlarged in the early 14th century, and now the main section encompassed the older part completely and the new outer bailey extended almost to the east part of the present main section of the castle. Further enlargements followed in the late 14th century and during the 15th century, in which connection the new outer bailey was built to the east of the older one. At the same time time, the present east tower was built into a gate tower and the east walls of the main section of the castles were constructed in line with the tower. At this stage, the outer works on the south side were constructed, i.e. a smithy yard and a garden for growing plants and herbs. Since its initial stages, the eastern outer bailey included a hexagonal south tower and a "bastion-horn" shaped towers at the southeast and northeast corners.

There was also a hexagonal tower in the middle section of east wall of the outer bailey, which was later replaced by the gate-tower.[5]

[1] Rinne 1914, p. 262.
[2] Drake 1995, pp. 107-108.
[3] Rinne 1938, pp. 323-327.
[4] Basing on his studies of the 1990s, Knut Drake suggests that the walls of the main castle were built in several stages. Drake 1996a, p. 34 Abb. 3.
[5] Rinne 1938, pp. 323-327.

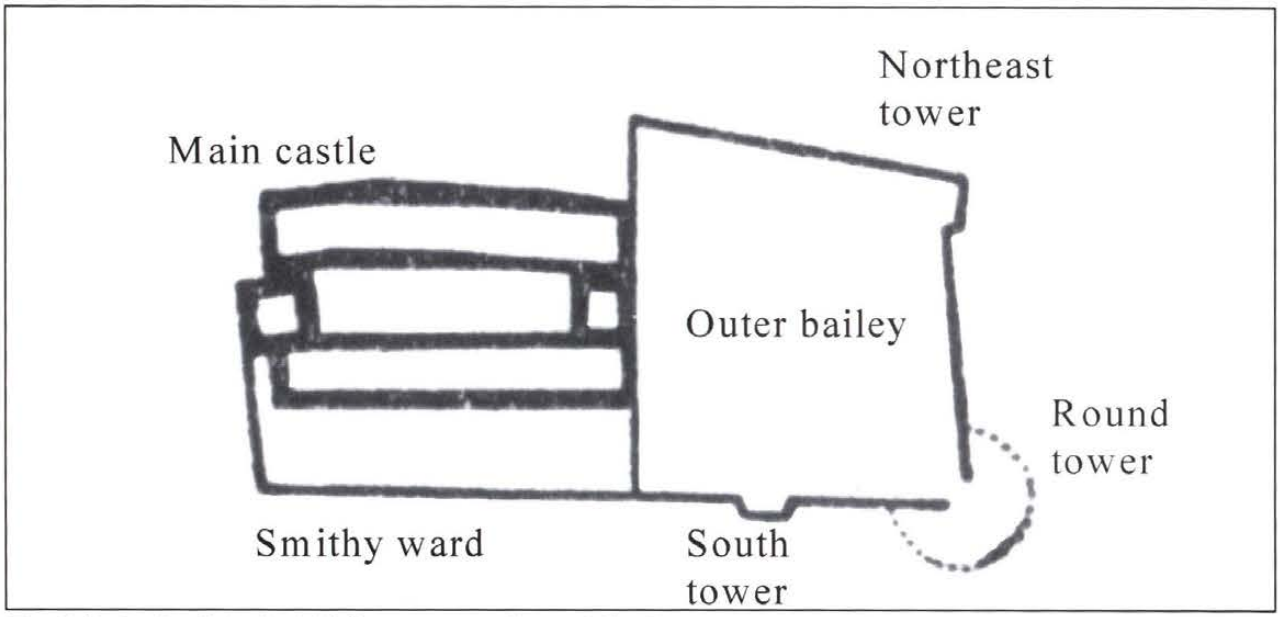

Fig. 6. Turku Castle in the Middle Ages, according to Iikka Kronqvist.
The eastern outer bailey included the south and northeast tower. The 16th-century round tower is marked with a dashed line. The only feature to the south of the castle is the smithy ward which was linked directly to the west tower. (Kronqvist 1947, p. 58. Redrawn by K. Uotila)

After the 1940s Rinne's studies or results have not been used very much in later research.[1] However, during Rinne's active professional period in the early 20th century, the main section of Turku Castle was almost completely measured and drawn. [2] This provided him with a material that seemed extensive and thorough for the basis of his conclusions.

Rinne's observations of the western outer ward/bailey are of most interest in view of the construction of the outer bailey. Rinne suggested that there had been a stonework structure around the freely standing west tower, i.e. also on its west side. The mortar-built remains of this structure had already come to light in excavations in the early years of the 20th century. These structures had also been discovered in 1930 and 1932, when Rinne drew plans of them and apparently took a number of photographs.[3] In later years, the veracity of these observations and the suggested date in particular have been questioned.[4]

During Rinne's time there was apparently little research on the eastern outer bailey and the outer wards on the south side. Rinne's suggestion of a hexagonal tower in the middle section of the east wall is not based on excavation; it is an interpretation based on the other towers of the outer bailey. Numerous drawing of the walls have been made in the south wards, but there have been no detailed studies.[5]

Iikka Kronqvist

Iikka Kronqvist began his research at Turku Castle in 1937, and launched an extensive programme of study in the summer of 1939. The purpose of this work was to carry out precise measurements of the castle and to outline its history of construction prior to repairs. The work, however, was interrupted by the outbreak of the Winter War in late 1939.[6] The surviving plans and drawings of the investigations show that the fieldwork had extended to the north wing of the main section and had partly included the west and east towers, though not yet the castle as a whole.[7] Kronqvist presented and discussed the results of this work in a few papers delivered in 1943, which were probably linked to a

[1] E.g. Drake 1993a, Drake 1994a, pp. 49-57; Gardberg 1967, pp. 7-52, Gardberg 1993a, pp. 48-49.
[2] Archives of the Dept. of Monuments and Sites, NBA. Turku Castle contains some 200 maps and plans from Rinne's period.
[3] Rinne 1900-1930; Rinne 1938, pp. 323-327.
[4] Gardberg 1959 p. 51. It is to be noted that Kronqvist did not note the west outer bailey in any way in his own studies (Kronqvist 1946.). Contemporary attitudes to Rinne's studies on Turku Castle are also expressed in a number of writings, e.g. Nordman 1945, p. 12.
[5] Sigrid Nikula (née Rinne) accompanied Juhani Rinne in field work in the 1920s and '30s. She largely accepts Gardberg's results and the questionable point in her opinion is the dating of the wall of the south outer ward to the 14th and 15th centuries, in which connection she points to two large cannon embrasures built in the 16th century, which faced the outer bailey wall. Nikula O. & Nikula S. 1987, p. 446.
[6] E.g. Drake 1994a, pp. 50-57 and Gardberg 1993b, p.11.
[7] Kronqvist 1937-1939.

posthumously published manuscript by Kronqvist. After Kronqvist's death in 1944 a book entitled "Turun linna keskiajalla" (Turku Castle in the Middle Ages) was published (Fig. 6). It appears to have contained Kronqvist's tentative manuscript on the history of the castle.[1] This is suggested at least by the fact that the book contains no notes or mentions of sources, although Kronqvist followed the normal conventions of historical studies in his other articles.[2]

Kronqvist's studies maintain that the present main section of the castle as a whole belonged to a castle built in the late 13th century, which had two gate towers and two smaller gates. There was also a log-built dwelling at the northwest corner and a warehouse of stone at the northeast corner. In the early 14th century, the castle was enlarged to the east and several buildings of stone were built in the ward. The courtyard or ward area was divided in two with a wall, and the eastern section became the outer bailey. During the late 14th and early 15th century, the castle was raised in height and an outer bailey was built on the east and south side. The castle church was constructed in the late 15th century (Fig. 6).

No extensive fieldwork was carried out in the outer bailey and ward areas during Kronqvist's period. This, however, did not prevent Kronqvist from presenting his own estimates of these features. He suggested that the south ward (smithy ward) had already been constructed as a herb or garden ward in the Middle Ages according to German prototypes and that it had included the eastern outer bailey from an early stage.[3]

Carl Jacob Gardberg

Repairs and renovations at Turku Castle were resumed after the Second World War, and they lasted until 1961. These works were directed by Carl Jacob Gardberg, whose doctoral dissertation on the 16th-century history of construction in the castle was presented in 1959.[4] In that work and in his later contributions concerning the medieval history of construction at Turku Castle, Gardberg has largely relied on Kronqvist's results and has added new features to them.[5]

During Gardberg's period in the 1950s, the first archaeological excavations were carried out in the eastern outer bailey. These provided observations of the numerous building stages of various age of the south wall of the outer bailey. According to Gardberg, data on the foundations of the walls of the outer bailey date the eastern outer bailey to the early 15th century at the latest, although the oldest known mention of the outer bailey is from as late as 1463.

In agreement with Kronqvist, Gardberg also links the upper southern ward (the smithy ward) with the same entity as the eastern outer bailey and the main section of the castle.[6]

In his most recent articles of Turku Castle, Gardberg has revised the date of construction of the outer bailey walls closer to 1463 ("during the 15th century at the earliest"), when the outer bailey is first mentioned in written sources. The new date is mainly based on a multi-part structure of posts excavated in the courtyard of the outer bailey in the 1980s. This component of the castle is older than the outer bailey. The posts are dendrochronologically dated to 1429 or earlier.[7]

Knut Drake

The results of Kronqvist's and Gardberg's research have been re-evaluated particularly during the 1980s. In 1985 Drake still concurred with the earlier studies[8], but new perspectives and results have emerged during the 1990s. Drake's studies on Turku Castle began with the stone building at the northeast corner of the main part of the castle (the so-called "Lords' Cellar") and its predecessors (Fig. 47).[9] New results concerning the history of the northeast part of the main section have in turn led to new interpretations of its east end and thereby to a new concept of the overall history of construction of Turku Castle.[10] In summary, we may say that Drake's studies date a major portion of the construction of the main section of Turku Castle

[1] Kronqvist 1946 and 1947; See also Cleve 1945, pp. 1-5, Gardberg 1967, pp. 7 and Nordman 1945, pp. 4-14.
[2] E.g. Kronqvist 1948b, pp. 81-95. I refer to an article on Magnus Tavast and Olavus Magni, in which the notes and references are according to established historical practice.
[3] Kronqvist 1946.
[4] Gardberg 1959.
[5] Gardberg 1967 and e.g. Gardberg 1993a, pp. 27-49; Gardberg 1993b, pp. 232-237. During the 1990s Gardberg and Drake have discussed the founding of Turku Castle, see Gardberg 1995, pp. 120-123 and Drake 1997c, p 75.
[6] Gardberg 1959, pp. 45-51.
[7] Gardberg 1993a, pp. 46-47.
[8] Drake 1985a, pp. 56-57.
[9] E.g. Drake 1984, pp. 118-134 and Drake 1992b, pp. 154-162.
[10] On recent conceptions of the early stages of Turku Castle, see Gardberg 1995, pp. 120-123.

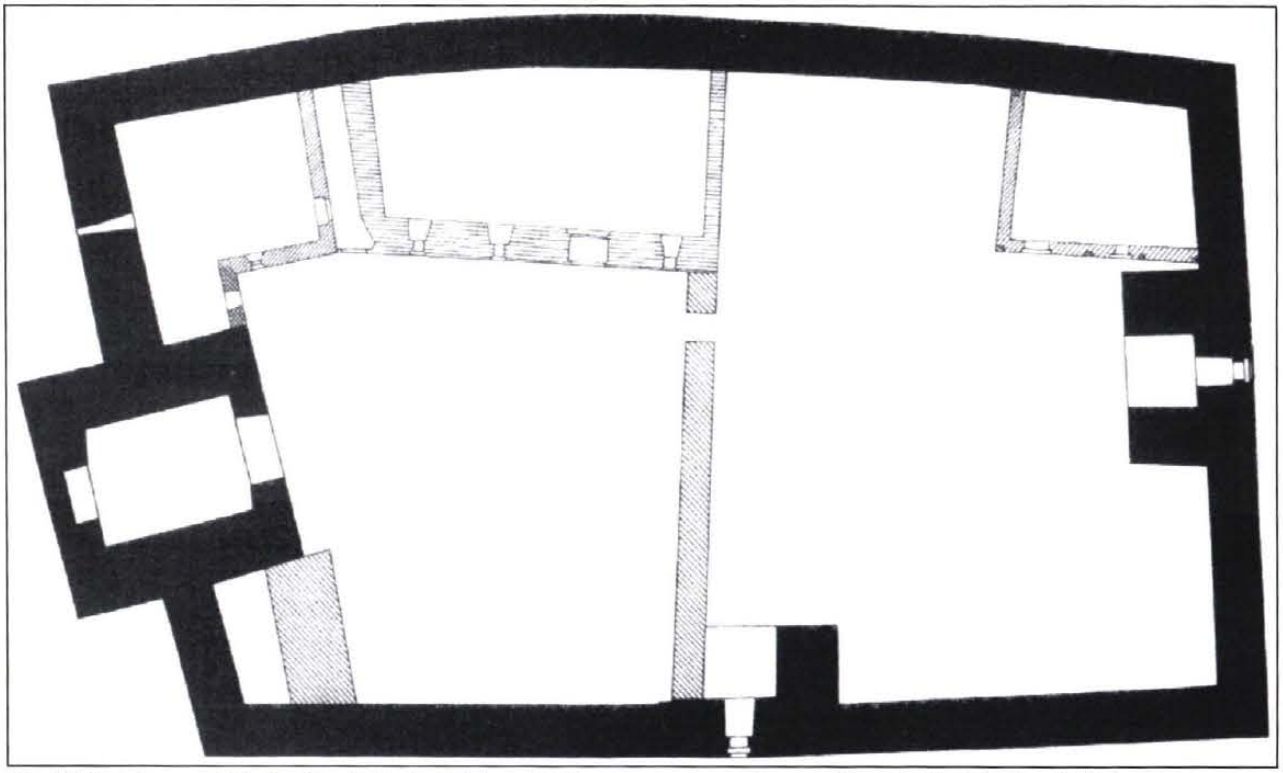

Fig 7. The history of Turku Castle in the 13th and 14th century, according to Knut Drake (Drake 1994a).

approximately a century younger than previously assumed (Fig. 7).[1]

The most important consideration for the history of the outer bailey is Drake's claim that the extended east end of the main section was not built until the close of the 15th century, when the so-called Sture church was built in the northeast corner. The walls of the outer bailey clearly seem to be linked to this extended east end, which means that the whole eastern outer bailey should be from as late as the close of the 15th century (Fig. 47).

Summary

According to earlier research, there was some kind of outer bailey in the main section of the castle in its early stages. Rinne maintained that the outer bailey emerged during the 13th and 14th centuries in the present area of the main section and grew during the Union period (ca. 1393-1523) to become the present location of the outer bailey. Kronqvist and Gardberg noted that the courtyard of the main castle was divided into the main section and the outer bailey in the early 14th century and that this division survived until the close of the 14th century. Drake, in turn, maintains that the courtyard area was not divided in two until the beginning of the 15th century.

Rinne claimed that the western outer ward which has subsequently disappeared dated from the close of the 13th century and the eastern outer bailey and the southern wards were from the Union period. Kronqvist dated the eastern outer bailey and the upper south ward to the close of the 14th century, and the lower ward to the Middle Ages. Working in the 1950s, Gardberg placed the outer bailey and the southern outer ward at the beginning of the 15th century, but has subsequently altered the dating closer to the year 1463. Drake and Antero Sinisalo[2] have dated the eastern outer bailey to the Sture period of the second half of the 15th century.

Fieldwork from the 1950s to the 1980s

The first actual excavations in the area of the eastern outer bailey were conducted in the 1950s, when older parts of the south wall were discovered. The addition of modern concrete posts to the outer bailey began in the 1950s, but related investigations were not conducted until 1974-1977, when the outer walls were excavated and posts were added.

[1] E.g. Drake 1993a, pp. 27-35 and 1994a, pp. 49-57 and Drake 1996a, p.31 and p.34. The most recent guide-book to Turku Castle is based on Drake's studies (Grönroos 1995, pp. 25-34).

[2] Antero Sinisalo's research was mainly concerned with the history of Olavinlinna Castle, but he also touches upon Turku Castle in a few general works (Sinisalo 1987, p. 112). Regarding the outer bailey, he suggests that it did not come under construction until the Sture period (1473-1499).

Between 1977 and 1987 investigations and repairs proceeded into the interior of the outer bailey, when it was completely renovated. Moreover, extensive archaeological excavations were carried out in the courtyard of the outer bailey in the 1980s.[1]

The outer baileys on the south side of the castle were investigated and excavation in the 1920s and 1930s under Juhani Rinne. In the late 1950s, most of the upper ward (so-called smithy ward) was excavated, revealing numerous remains of buildings and artefacts.[2] The outer wards on the south side have not been investigated since the early 1960s.

Scale models demonstrating the history of Turku Castle

Iikka Kronqvist's methods included the construction of scale models to be made in connection with investigations and with which he tested observations. In the late 1930s a number of scale models of Turku Castle were made, but their later fate is unknown. Only photographs of the models survive. These have come to play an important role in understanding Kronqvist's interpretation of the castle´s history.[3]

When the Turku Provincial Museum prepared a permanent exhibition in Turku Castle, scale models were also constructed of its various stages. The models mainly follow Kronqvist's and Gardberg's conceptions, but they also take into consideration, at least in part, the archaeological excavations of the 1970s and '80s. The scale models were made by the conservators Reino Mattila and Juha Stenberg.

The Turku Castle project

In 1991, the so-called Turku Castle Project was launched and has received funding for some years from the Academy of Finland. The leader of the project is Dr. Knut Drake, and in 1991-1994 the participants were Marita Kykyri, Aki Pihlman, Lena Törnblom and Kari Uotila, all of whom have prepared academic studies and theses on Turku Castle. The first of these was Aki Philman's 1995 licentiate thesis on medieval ceramics from Turku Castle and the city of Turku.[4]

The project has also included a team of geologists led by Gunnar Glückert, studying the geological development of the original island site of the castle.[5]

Some 30 dendrochronological dates have been obtained from the rich timber material from the castle under the direction of Pentti Zetterberg.[6] Four radiocarbon dates of wall mortar from the structures in the northeast corner of the main section of the castle have been prepared under the direction of Högne Jungner.[7] Botanical studies of soil samples from the eastern outer bailey have been carried out by Marjatta Aalto. In November 1992 the project organized a seminar on research being carried out at the castle. The papers of the seminars were published in 1994 in volume 16 of the bulletin series of the Turku Provincial Museum.[8]

I regard the Turku Castle project as a completely new stage in architectural history in Finland. Since the 19th century, persons who have conducted field-work have also published their studies. This tradition is represented by names such as Reinhold Hausen, Juhani Rinne, Iikka Kronqvist, Carl Jacob Gardberg, Knut Drake and Henrik Lilius, all of whom have had a personal grasp of the objects of study. Within the Turku Castle project, the material is being treated by researchers who have not carried out fieldwork themselves. This provides an outside perspective, but also entails a number of problems. Every trained researcher can and will make field observations, but personal ideas and concepts will not necessarily be recorded or documented. These ideas and interpretations are very difficult to establish in hindsight. At the same time, an outside researcher cannot be aware of the practical aspects of the fieldwork (funding, verbal instructions etc.) and will therefore easily take a highly critical view of earlier studies. A good example of the relationship of an outside researcher to an object of study is the research concerning the House and Church of the Holy Spirit in medieval Turku carried out in the 1980s and the critical interpretation of these results in the 1990s. In this situation, Sirkku Pihlman sharply criticized the fieldwork while unaware of the instructions given to the field archaeologists and their methods of reporting.[9]

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[1] Turku Castle archives, NBA (East and north wings 1974-1977; Kajala 1977-1986; Measured drawings of the outer bailey; Round tower 1959-1962; Soiri & Merikanto 1974; Willner & Vaurio 1974). See Kajala 1993, pp. 28-31 and Kijanen 1993, pp. 16-21; Kykyri 1994, pp. 82-83; Laaksonen 1984, pp. 71-78; Pihlman A. 1994, pp. 70-79.

[2] Smithy ward 1957. See Gardberg 1959, pp. 50-51.

[3] Kronqvist 1946. See Drake 1994a, p. 52 and Gardberg 1959, pp. 35-44.

[4] Pihlman A. 1995.

[5] Glückert et al 1992; Glückert & Paatonen 1994.

[6] Zetterberg 1994

[7] Jungner 1994b.

[8] Drake 1994.

[9] Kykyri 1995, pp. 124-128; Pihlman S. 1994, pp. 63-65.

2.2. Research Material on the Outer Bailey of Turku Castle

Historical sources

Among the sources on the construction of the outer bailey of Turku Castle are various historical documents on outer baileys. Owing to the subject at hand, these are very few in number. The outer bailey of Turku Castle is first mentioned in 1463, when a meeting headed by King Christian was held in the cabbage patch of the outer bailey.[1] In two similar sources the outer bailey is mentioned without any further definition.[2] The situation with regard to other castles in Finland is even worse, for the only other mention in sources concerns the outer bailey of Raseborg Castle in 1427, when the provincial diet convened there.[3]

It is extremely rare for outer baileys to be mentioned by name in medieval sources. This is demonstrated for example by events that took place at the Turku castle in years 1505-1507. Although the work on the tower and walls that collapsed in 1505 was significant at the time, it is not specifically mentioned that it concerned the outer bailey. The sources refer only to large-scale repairs.[4]

In summary, it can be said that the few direct references in sources mention some kind of meeting held in the outer bailey, but it is difficult, if not impossible, to link this meeting to any building activities.

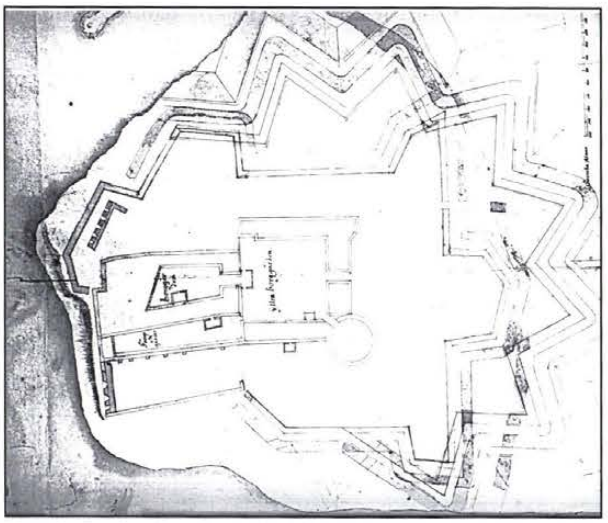

Fig. 8. Turku Castle in the 18th century. (KrA Utländska kartor. Åbo nr 7.)

A further group of sources consists of 16th-century and later documents on the construction of the outer bailey. These also contain references to older structures, most often in connection with repairs or renovations of medieval structures. The 16th-century documents pertaining to Turku Castle were already investigated thoroughly in connection with Gardberg's 1959 dissertation.[5]

The third group of source material consists of various maps, plans, paintings and other pictorial representations of castles. The most extensive body of cartographic material consists of 17th-19th century maps, plans and their copies in the War Records Office in Stockholm (Fig. 8). Cartographic material, however, is very difficult to use in studying the medieval outer bailey, for the oldest structural components were covered by 16th-century constructions and were, in practice, destroyed long before the maps and plans were drawn.[6]

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[1] FMU IV 3207."j kolgardhen nidher i forborghaenne for Abo sloth". This source does not mention whether the outer bailey was of stone or timber, and its location is unknown. Gardberg links this mention with the eastern outer bailey, because it was the only outer bailey mentioned in 16th-century sources (Gardberg 1959, pp. 45-46.).

[2] FMU IV 3204 (18.7.1463). "forborgen". FMU IV 3205 (25.7.1463) "forborghen". See Gardberg 1959, p. 45.

[3] "I Raseborgs forborgh" The available source from 1427 permits no conclusions regarding the location or building materials of Raasepori Castle. (FMU 1824) E.g. Gardberg 1993a, pp. 85-86 and Lovén 1996, pp. 156-158.

With regard to the castles Hämeenlinna (e.g. Luppi 1996), Viipuri (Hackman 1944, pp. 64-82) and Kastelholm (Carlsson 1993, pp. 21-24; Törnblom 1996, p. 10.), the oldest written reference to the outer bailey are from the 16th century The outer baileys of Kuusisto Castle are not mentioned in a single medieval or post-medieval source (e.g. Hausen 1881).

[4] FMU VI 5110 and 5244.

The area that collapsed in 1505 and the repairs of 1507 can be linked with the eastern outer bailey only indirectly. It was not until archaeological investigations that it was possible to confirm that the collapse most probably concerned the south part of the outer bailey. See Gardberg 1959, pp. 46-47.

[5] The written sources of the 16th century were already discussed in 1891 (Snellman 1891, pp. 9-33). Gardberg's studies, however, combine the building-archaeological studies of the main castle with archive sources (Gardberg 1959).

[6] Swedish War Records office (KrA). Utländska kartor. Åbo nro 1-29. Some of the maps and plans in the Swedish War Records Office were published in colour in Snellman's study (Snellman 1891). On the oldest maps, see also Gardberg 1959, pp. 541-548; Kostet 1995, pp. 39-41. In addition, the appendix to Snellman's study contains a colour print of E. Moraenson's plans and sections of the main castle and outer bailey from 1770 (Snellman 1891).

Fig. 9. Early 19th-century painting by Thomas Legler showing the mouth of the Aurajoki River. The enlarged detail shows Turku Castle from the southeast. In the foreground is the light-faced eastern outer bailey with the upper south ward (smithy ward) to its left (Collections of the Turku Provincial Museum TMM 4070 and photograph RF 88 803).

Paintings by artists of the 18th and 19th centuries are not a reliable historical sources as the maps and plans, but they too can sometimes reveal the forms of lost building components or walls. Paintings of Turku Castle can even indicate the height of the walls of the southern outer bailey (so-called smithy ward) that was destroyed or torn down in the 19th century, as well as other structural details such as supporting pillars and loopholes (Fig. 9).[1]

The use of paintings as sources on building archaeology entails the problem that they do not always seek to present the details of the castle. Moreover, the paintings cannot give any indication of the stages of construction involved. Therefore, the details found in paintings, such as windows or loopholes, can either be centuries old, or a product of the artist's imagination.[2]

[1] Pictures of Turku Castle are known from 18th century onwards. They depict a clearly functioning upper south ward of the same height as the eastern outer bailey (Gardberg 1952, pp. 16, 18, 24-25). The walls of the south outer bailey (in poor condition) can still be seen in an oil painting (Fig 9.) from the 1830s by Thomas Legler (TMM 4070 and Gardberg 1993a, p. 11).
In other early 19th-century paintings, the walls of the south outer ward are no longer shown. For example, two paintings of "Turku castle and the mouth of the Aurajoki River" by the Russian painter Sergeyev show no high walls in the south outer ward area, although the paintings are probably from 1811. (Kuurne 1994, paintings 34 and 35). The walls of the outer bailey are completely lacking from a wash by Johan Knutson from the 1840s (e.g. Gardberg 1993a, p. 20).

[2] The use of various kinds of pictures and illustrations in the study of medieval castle structures has been given a prominent role at Hämeenlinna Castle (e.g. Luppi 1996, pp. 118-119).

The archaeological material

The source material for a study on the history of construction of the outer bailey of Turku Castle consists of several groups , all of which entail various methodological problems.[1] The chief sources are measured drawings (scale 1:50) of the outer walls of the outer bailey. These were prepared with great care and it has been possible to apply the associated measurements of bricks in studies. The drawings do not contain any actual structural observations; they document the situation as it existed in the 1950s and '60s. Moreover, the measured drawings of the walls end at ground level, and maps and plans do not include structures later revealed from under the soil. The above-ground drawings of the walls and later excavations plans showing walls below ground level have never been combined.

The excavations of the 1970s were carried out in connection with the construction of foundation posts for the outer bailey, which meant that repairs dictated the locations studies - and even worse, the methods applied. The revealed walls were only partly drawn and there were unsuccessful attempts at photographing some of the walls to scale. In addition, the soil adjacent to the walls was not excavated archaeologically, and the artefact finds are of no use for dating the structures.

There is also a problem of measurement concerning the 1974 excavations in the south wing of the outer bailey.[2] In his research in the 1950s, Gardberg observed that the oldest walls extended to an elevation of 0.5 metres below present sea level. The fieldwork of the 1970s apparently employed a different system of elevation at various stages, although the documents claim that all elevations are in relation to the castle's benchmark of 10.37 metres a.s.l. The walls and the revealed sections of wall are drawn on a profile of the façade, in which the so-called basic line was -6 metres (i.e. +4.37 metres a.s.l.). The lowest walls were some 4 metres below this line. These measurements were carried out by researchers and draughtsmen of the National Board of Antiquities. The excavation plans and profile drawings of the 1974 excavations are also related to the basic line of -6 metres (i.e. +4.37 metres a.s.l.), but a comparison of the structures shows that the excavation plans are some 150 cm higher than the measured drawings of the whole wall. For example the height of the log framework foundation of the southwest corner of the south tower is, according to the measured drawings of the wall, +0.7 metres and +2.30 metres with reference to the detailed profiles. In 1974 the lowest room area of the south tower, which revealed numerous structures of different age. Their documentation employed a "lower" elevation line and they can be accommodated to the uniform series of measured drawings of the wall, although the interior and exterior excavations were carried out by the same persons. The present study proceeds from the assumption that the tradition of measuring elevation of the 1950s is correct and that the wrong elevations of the profiles are due to some error. The problem is compounded by the fact that some of the profile sections are "almost" correct, with an error of only some 30 cm in elevation.

The wall investigations of the 1980s were limited to repaired rooms and to repaired wall sections within them. For example, for practical purposes the rooms of the bottom storey of the outer bailey have not been documented at all. Moreover, the documentations of the investigated rooms has varied considerably and the use of building-archaeological terminology has been inconsistent.

The methodological weaknesses of the research material and its random nature are not the fault of individual researchers but are due to the way in which historical archaeology has been practised in Finland.[3] The investigations have only been a part of repairs and building work and in addition only the most absolutely necessary part is done.[4]

In addition, repairs of Turku Castle have proceeded from the position that each building stage of the castle is valuable as such and that there is no explicit aim of establishing the oldest stage of construction.[5] This prevailing concept of the goals of restoration has had the result that areas of importance for research may not be given the attention which they deserve. In dealing with the outer bailey of Turku Castle, this has led to a situation where research and documentation has only covered the structures revealed during repairs, and there has been no attempt to establish the connections between structures or various stages of construction.[6]

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[1] The whole material on the castle is filed in the Archives of the Dept. of Monuments and Sites, NBA. Turku Castle.

[2] Archives of the Dept. of Monuments and Sites, NBA. Turku Castle.

[3] The research problems of repair and investigations of medieval castles have been discussed to only a small degree. An instructive example, however, was a seminar held in 1992 on archaeology and medieval studies. In this connection, Elias Härö pointed out that the guidelines of the extensive repairs and investigations that began in the 1940s had already been laid down in the 1930s and could not be changed (Hiekkanen 1992, p. 22).

[4] E.g. Suna 1993.

[5] Raatikainen 1993.

[6] E.g. Laaksonen 1984, pp. 71-78; Suna 1993.

3. THE EASTERN OUTER BAILEY

Also known as the outer bailey of Turku Castle, this structure measures 50-53 metres E-W and ca. 58-64 metres N-S, forming an almost square shape. It has been divided into the following components in investigations carried out between the 1950s and 1980s: the southwest wall, the south wing (including the south tower), the southeast tower, the east wing, the northeast tower, the north wing and the northwest wall. The rooms of the present outer bailey were first numbered in the investigations of the 1950s-70s, and again in the 1980s (the plans of the various storeys of the baileys are given in Appendix 1/ Plates II-V).[1]

3.1. Layers Beneath the Walls of the Eastern Outer Bailey

The wall foundations of the eastern outer bailey are located several metres beneath present ground level. Observed in many locations beneath these structures are clearly older timbers and also layers of earth, which, however, have not provided dates based on artefacts (Fig. 10) .

In 1974 several locations beneath the wall of the south section were excavated for installing foundation posts (Fig. 11). These trial sections suggest that underlying the mortared grey stone wall was a thick cultural layer. Uppermost in the central section of the wall is a log framework at an elevation of ca. +160-+200. Beneath this, at +130-+160 was a layer of crushed brick and wood carvings, followed at +110-+130 by assorted cultural layers containing burnt soil, carvings, gravel, a section of timber and a stone. Beneath this part, at +080-+110 are sand and gravel with inclusions of stones and mortar, followed at the elevation of +070-+080 by decayed wood and soil, gravel at +060-+070, and clay beneath it at ca. +060. The profile section indicates a cultural layer of 90-100 cm underlying the wall.[2]

The second excavated section indicates a layer of clay and wood carvings at least 70 cm thick beneath the log framework foundation of the wall (Plate IX: profile section K-K). The upper part of the layer is

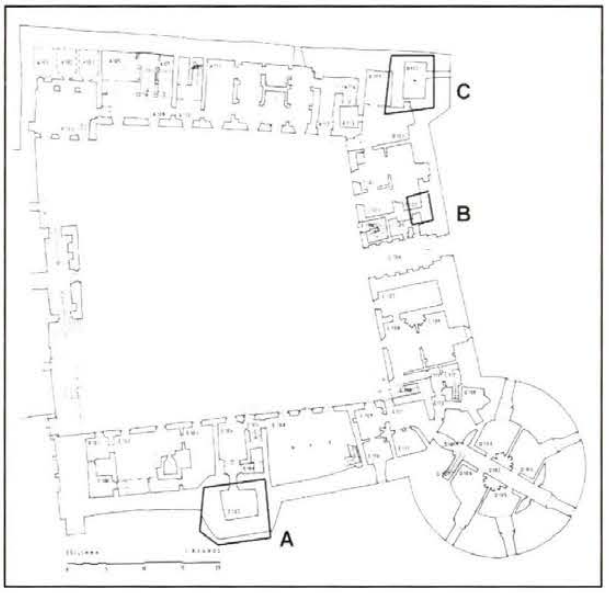

Fig. 10. Older timber structures and earth layers discovered beneath the walls of the east outer bailey of Turku Castle. A=south tower area, B=north side of the gate tower, C=northeast tower. (Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Redrawn by K. Uotila).

beneath the log framework at +170-+180 and the lower edge is at +110, beneath which is most probably clay; at any rate excavation has halted at this stage.[3]

One of the most interesting features of the earth layers is that clay is first encountered at an elevation of +0.60 above present sea level. From +0.80 upwards this is overlain with strata pointing to human activity, which, however, were not deposited in water but on dry land.

In addition to the oldest log framework beneath the south tower, this location has also revealed timber members possibly belonging to some other structure. These include, for example, two horizontal logs beneath the east wall of the room area at +0.10-+0.40. Overlaying the logs was at first ca. 40 cm humus layer, above which was the log framework underlying the masonry of the tower and slightly depressed towards the east. [4]

A similar, almost horizontal timber was revealed beneath the exterior southwest corner of the oldest south tower (Plate IX: section D-D, L-L). There was a thick length of timber at elevation ca. +0.05 beneath the tilted log framework.

[1] Used here is the most recent numbering of the rooms of the castle, which is marked in the measured drawings of the National Board of Antiquities and has also been published (Raatikainen 1993, appendices II-V). The earlier numbering of the rooms is given in the Archives of the Dept. of Monuments and Sites, NBA. Turku Castle.

[2] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[3] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[4] Soiri & Merikanto 1974.

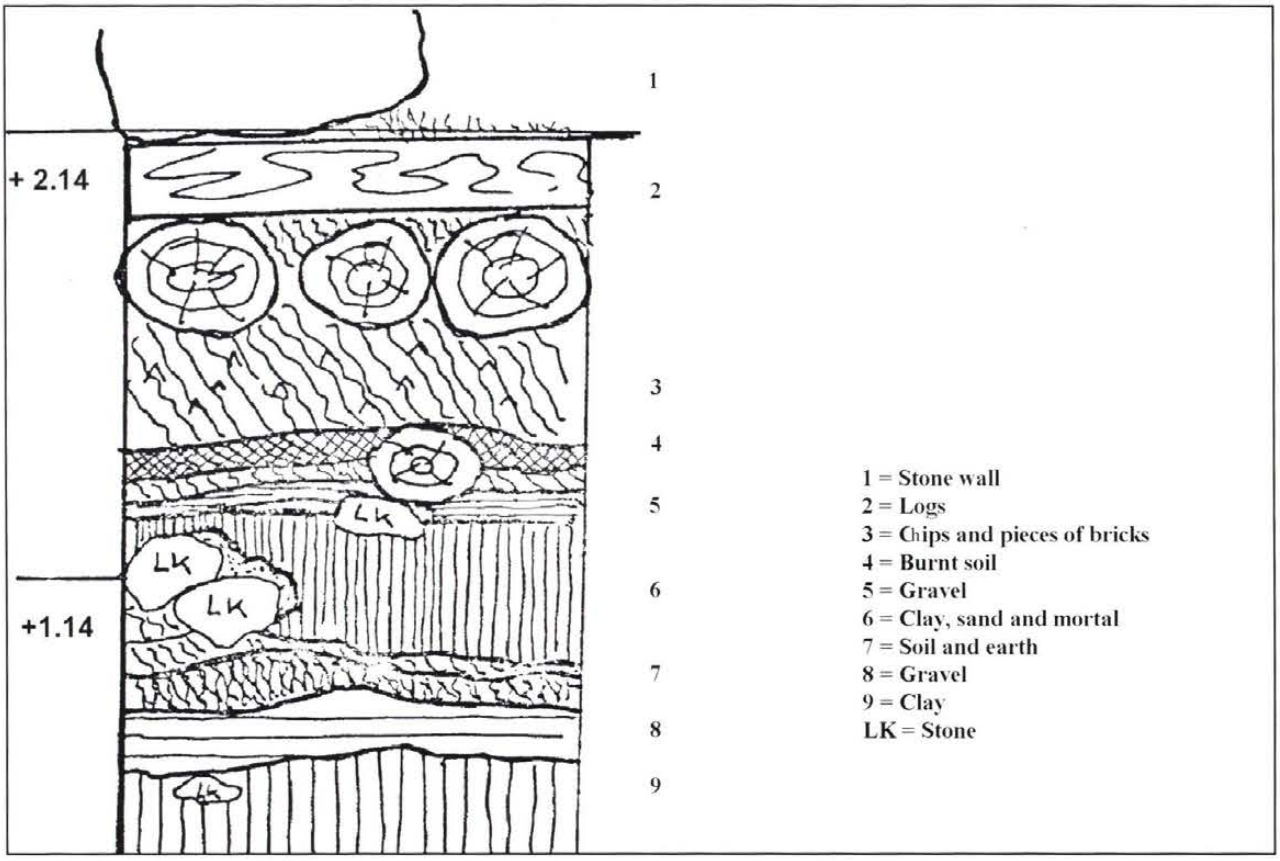

Fig. 11. Structures and earth layers from beneath the south wall of the east outer bailey of Turku Castle. The structures of the outer wall extend to approximately elevation +1.80, after follow almost one metre-thick mixed layers of soil and clay. Undisturbed clay begins at roughly +0.80. (Illustration from the Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Redrawn by K. Uotila).

Under the east wall of the tower excavation revealed several pieces of timber at elevation ca. +0.50 which, according to the excavation plans are not directly associated with the log framework.[1]

The logs beneath the south tower are at elevations of +0.05-+0.50 metres a.s.l., and as such are also evidence of exceptional stratification in this area. Moreover, these lowest timbers are laid straight and are not inclined towards the east and the south, like the overlaying log framework.

It is difficult to say with reference to the timbers themselves whether or not they were associated with an older wooden defensive structure at the site.[2] For example, a humus layer of ca. 40 cm has formed on top of the log under the south tower, which would preclude any timber structure rising from it. There is no doubt of wooden material predating the wall structures around the south tower, but there are no indications of a connection with an earlier defensive work of timber (see chapter 5.1. on dendrochronological dating).

Although there are no similarly certain observations of cultural layer of timber members in the other parts of the outer bailey, a log framework extended beneath the wall of the eastern gate tower. At the northeast tower the log framework foundation of the tower overlays a distinct SW-NE-laid row of posts. Continuing beyond the tower, it is clearly older than the latter.[3]

In summary, we can say that in several places in the eastern outer bailey there are random observations of wooden structures and layers of earth beneath the walls. There are, however, no indications of a building and or a defensive work of timber. It is clear that large areas of the outer bailey were in active use before the stone walls were built and that the surviving layers indicate the most important area to be the south part of the outer bailey on the bank of the Aurajoki River.

[1] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[2] The problem of the older wooden defensive structure is important, for in principle logs from an early breastwork could have been used in the timber framework foundations of the outer bailey. Accordingly, the dendrochronological dates would be associated with the wooden structures and not the foundations.

[3] The east and north wings of the outer bailey 1975-77.

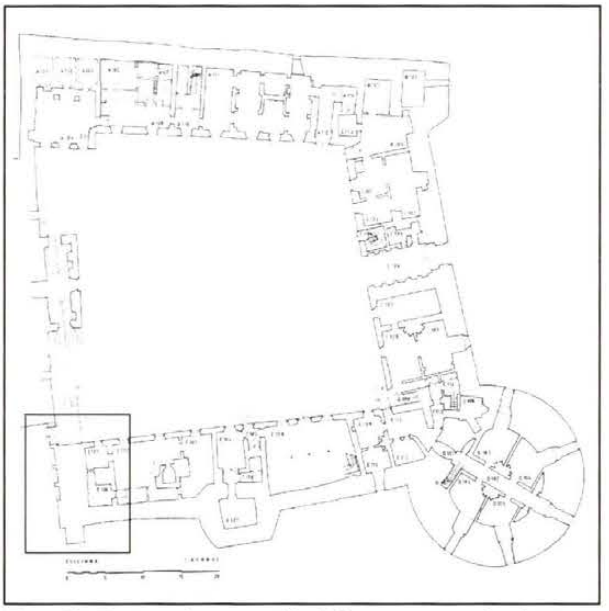

Fig. 12. The southwest wall of the east outer bailey.

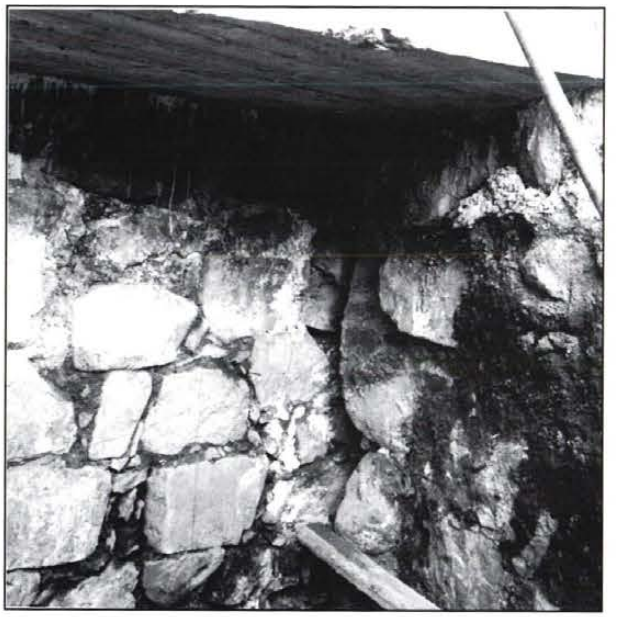

Fig 13. On the left in the picture is the older southwest wall of the east outer bailey, with the south wall of the smithy ward, built to join the former, on the right. In the upper section is the present southwest wall, built on top of both walls. (Archives of the Dept. Of Monuments and Sites, NBA, Turku Castle. Photo negative 2452)

3.2. The Southwest Wall

3.2.1. The oldest wall structures

Excavation at the southwest corner of the present outer bailey revealed two grey stone walls running SE-NW and situated beneath the walls of the present N-S oriented outer bailey (Fig. 12). The older SW wall contained two adjacent structures, of the older one was eastern wall. Parts of this structure came to light from beneath the present outer bailey and in the outer ward area (Plate VI, Fig. 13). The wall was originally ca. 150-160 cm thick and had been built on a log framework foundations, which had probably been at an elevation of ca. +220-+230. Field observations show that the oldest part of the wall had slightly inclined towards the east, i.e. the ward of the outer bailey. Parts of it were excavated from beneath the present outer bailey and in the courtyard area (Fig. 13).[1]

A grey stone extension was built at a later stage on the west side of the oldest wall. The extension was constructed on a double log framework at an elevation of +2.80-+2.90, i.e. roughly half a metre higher oldest wall. On the log framework is a ca. 150 cm-high foundation, where the wall was ca. 110 cm thick. From elevation +4.50 a.s.l. upwards the wall extended ca. 80 cm thick to elevations +7.00-+8.00. The stones of the structure are laid in slightly irregular layers with wide mortaring seams including wedges (Plate VII).[2]

A high profile of earth formed against the enlarged part of the southwest wall. In this feature the lowest layer consisted of clay at elevation +3.50. We may doubt if it is original, since the log framework foundations of the adjacent walls clearly extend to a lower depth. Overlaying the clay was a layer of mortar at +3.50-+3.80, which was apparently attached to the wall and had come about in connection with the enlargement of the wall. On top of the mortar was a 2.5-metre-thick profile of earth containing layers of humus soil and crushed brick.[3] They suggest that the western outer surface of the southwest wall was exposed for a long period, because a 2 to 3-metre-thick cultural layer had formed next to it prior to the construction of the present southwest wall (Plate VII: Elevation).

An extreme difficult question is how the oldest southwest wall was connected to the main part of the castle. Field work has not revealed the structural connection of the southwest wall and the southeast corner of the main part, since this corner has in front of the wall a two-metre-wide foundation or supporting structure, which is a secondary repair

[1] Soiri & Merikanto 1974.

[2] Soiri & Merikanto 1974.

[3] Soiri & Merikanto 1974.

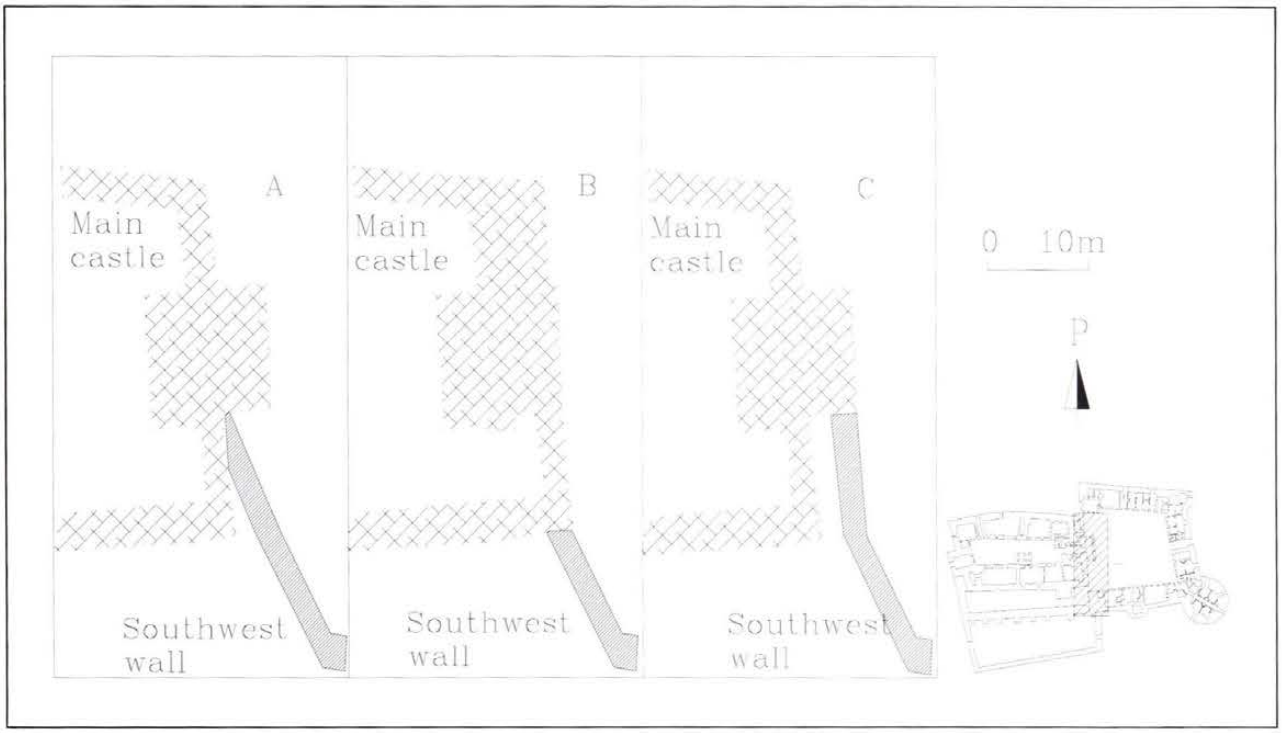

Fig. 14. The connection of the oldest southwest wall of the east outer bailey with the main castle is open to interpretation. The east end of the main castle was expanded during the Middle Age and it is not definitely known to which stage the oldest outer bailey was connected.
The outer bailey wall could have continued at an angle as far as the joint of the older east wall and the east tower (A), or it could have ended at the southeast corner of the later east wall (B). A third possibility is that the lower section of the present east end is part of the outer wall, whereby the outer bailey wall extended as far as the east tower (C). Accordingly, there would have been a narrow area of access between the main castle and the outer bailey, as at the junction of the west part of the main castle and the south ward at the other end. (Drawing by K. Uotila)

feature. Therefore, there is no definite archaeological data on a structural connection between the main part and the outer bailey, and this point must be left to conjecture (Plate VII:Plan).

Until the 1970s, it was assumed in studies on the history of construction of Turku Castle that the southwest corner of the outer bailey was a direct N-S-oriented continuation of the east front of the castle. The orientation of the subsequently revealed older wall section can be linked to the present southeast corner of the castle and with reservations to the connection of the older east face and the east tower, whereby there would have been a narrow area between the walls the main part and the outer bailey, which is not the best possible solution for defensive purposes. Assuming that the southwest wall of the outer bailey ended at the southeast corner, possible access route from the main part of the castle to the top of the outer bailey would have been at the east face where we could assume to have been some opening for this purpose. Another alternative would have an opening for access to the walls of the outer bailey in the south wall of the east tower (Fig. 14).

The third possible solution could be parallelled to the connection of the southern outer bailey to the main section. The structures in this area have not been investigated in detail, but according to Kronqvist's interpretation, the wall of the southern ward was in direct contact with the west tower of the main part, thus leaving a narrow passageway between the walls.[1] There could have been a similar structure at the east face of the castle, although the first part of the wall would have been straight and only its further section would have turned obliquely towards the southeast (Fig. 14).

3.2.2. The present southwest wall

The section of wall above the older southwest wall and its supporting part were torn down to make room for the new wall. Also demolished was the upper part of the south wall of the "smithy ward" (the upper southern ward). The new wall aligned with the east face of the main part of the castle, i.e. it stands out clearly from the orientation of the older wall. There is no data on the wall foundations, but it appears that the wall was built directly onto the

[1] Kronqvist 1947, p. 58.

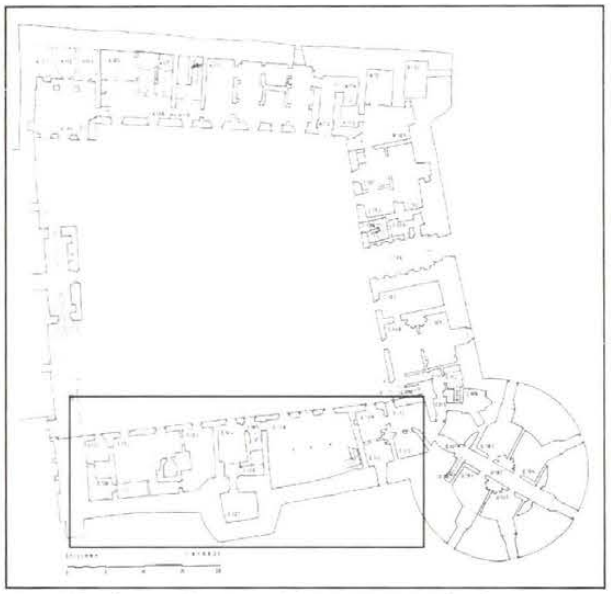

Fig. 15. The south wing of the east outer bailey.

cultural layer. Moreover, the construction of the lower part of the wall is unknown. The visible upper part was originally built of brick in Polish bond and in the lower part are three semicircular relieving arches of brick on the west side of the wall (Plate VI).

The new wall part is exceptionally thick — ca. 440-460 cm — although it is possible that there are several adjacent components within the wall. All in all, the structures of the present southwest wall are not well known. The brickwork of the upper part is highly similar to the brick wall of the whole eastern outer bailey, and they belong to the same stage of construction (Plate VII).

3.3. The South Wall and the South Tower

3.3.1. The oldest south wall

In the 1950s and '70s several old building components were excavated from beneath the outer wall of the present south wing (Fig. 15). They are older than the present south wing. The wall connection pointing to the contemporaneous construction of the oldest southwest wall and the oldest south wall, as discussed above, came to light in room E 100, which contains the rounded inner corner of the SW and S walls. The structure clearly shows that both walls are from the same construction stage. This is suggested by the laying of the log foundations in a curving configuration parallel to the wall and the slightly curved corners of the walls. Outside the oldest wall on the south side there is a field observation of the log foundation of the wall ending at the line followed by the southwest wall. This is to be understood so that there was a slightly round corner at the joining of the walls (Plate VI).

Built onto this oldest corner was at least the east wall of the lower south forecourt (herb-garden ward), as shown by studies carried out in the 1970s.[1] There is a distinct joint in the the west side parts of the castle suggesting that the "herb-garden ward" was built adjacent to the "smithy ward", which permits the assumption that also the latter was built to adjoin the oldest south wall.

Excavations first in the 1950s and later in the 1970s revealed in the area south of the south wall of the present outer bailey and from beneath the wall a two-part wall structure, as in the above discussed southwest wall.

The actual wall was a wide and slightly leaning masonry structure closer to the outer bailey and extending beneath the present outer bailey. In the middle part of the older wall structure was a small tower (the south tower), on the east side of which the older south wall extended towards the east.[2]

The older wall structure was apparently built on a log foundation of several courses so that lowermost there were sparsely placed vertical logs with notched upper parts, followed by a log framework laid parallel to the wall, above which was a distinct log framework crossing the line of the wall. The top log framework extended from the middle part of the wall and to approximately one metre south of the line of the wall.[3] This kind of wooden foundation of three courses of logs up suggests that the builders were aware of the poor foundation of the site (Plates VIII, IX, X).

The log framework foundation, however, did not remain in place, but was clearly inclined in various directions. In the west section of the wall it was inclined some 70 cm towards the east over a distance of 14 metres, for in the westernmost end the logs were at elevation +240, in the middle section at ca. +200 and at +170 next to the south end. This was not a question of installing the framework on sloping ground, for the courses of stone higher up in the masonry of the wall are similarly inclined. This suggests that the whole structure leans towards the east. In addition to the slight incline towards the east, the logs of the uppermost course of the frameworks are tilted

[1] Soiri & Merikanto 1974.
[2] Gardberg 1959, pp. 45-50; Soiri & Merikanto 1974; Willner & Vaurio 1974.
[3] Soiri & Merikanto 1974.

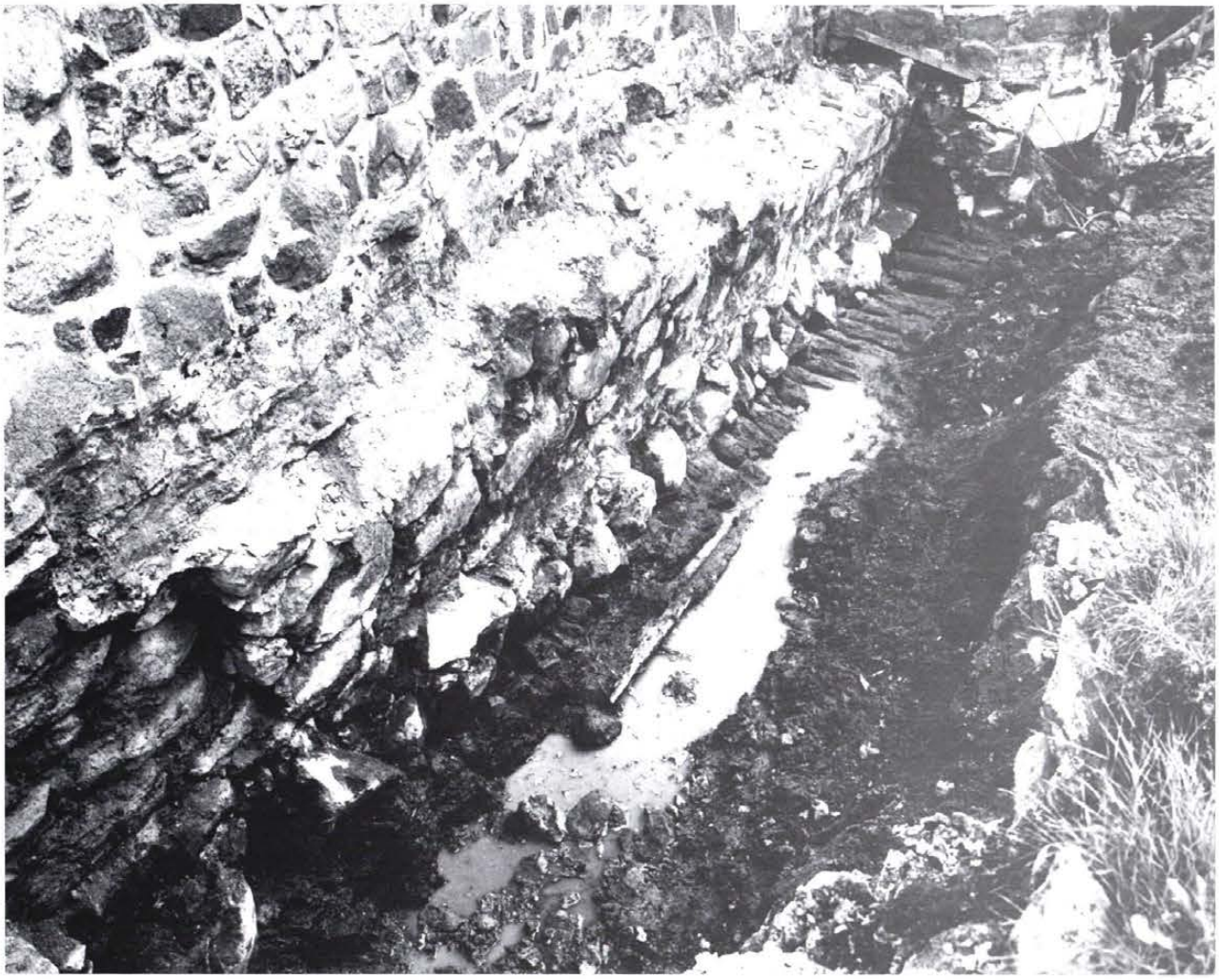

Fig. 16. The oldest south wall of the east outer bailey.
The lowest feature, overlaying the clay layer, is the double log framework of the oldest wall, which is followed by masonry of undressed stone. Both components have clearly leaned towards the Aurajoki River. The present south wall was later built on top of the leaning wall and laid out with a different course than the old wall. The upper of the illustration shows the revealed wall structures of the oldest south tower and the present hexagonal tower. (Photograph by P.O. Welin. Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Photo negative 2424)

towards the south, i.e. towards the Aurajoki River, by over ten degrees (Plates VIII, IX, X).[1]

The wall of the east part was most probably built - like the western section — on a double log framework, of which excavation revealed only the upper construction, located crosswise to the wall. In the middle section of the wall, the upper edge of the log framework was at an elevation of ca. +150, from which point the log framework and the masonry structure on top of it descend ca. 30-40 cm towards the south tower. In other words the log framework is at an elevation of ca. +120 next to the south tower. The log framework tilts ca. 8-8.5 degrees towards the north, i.e. the interior part of the wall.[2] Here, the incline is in the same direction as for example in the east wall of the outer bailey, although it clearly differs from the other walls of the south part (Plates VIII, IX, X).

Overlaying the log framework in the west section is a foundation structure one stone course high built almost completely without mortar. This is followed by a relatively damaged stone wall, whose height is ca. 200 cm in the west section. The stones vary greatly in size, and they are laid only randomly in rows (Plate X).

The mortar and stones used as wedges are prominent in this structure. The slight tilting of the log foundation towards the east extends to the masonry section. There are two large cracks in the wall, apparently extending through the wall, and

[1] Soiri & Merikanto 1974.
[2] Willner & Vaurio 1974.

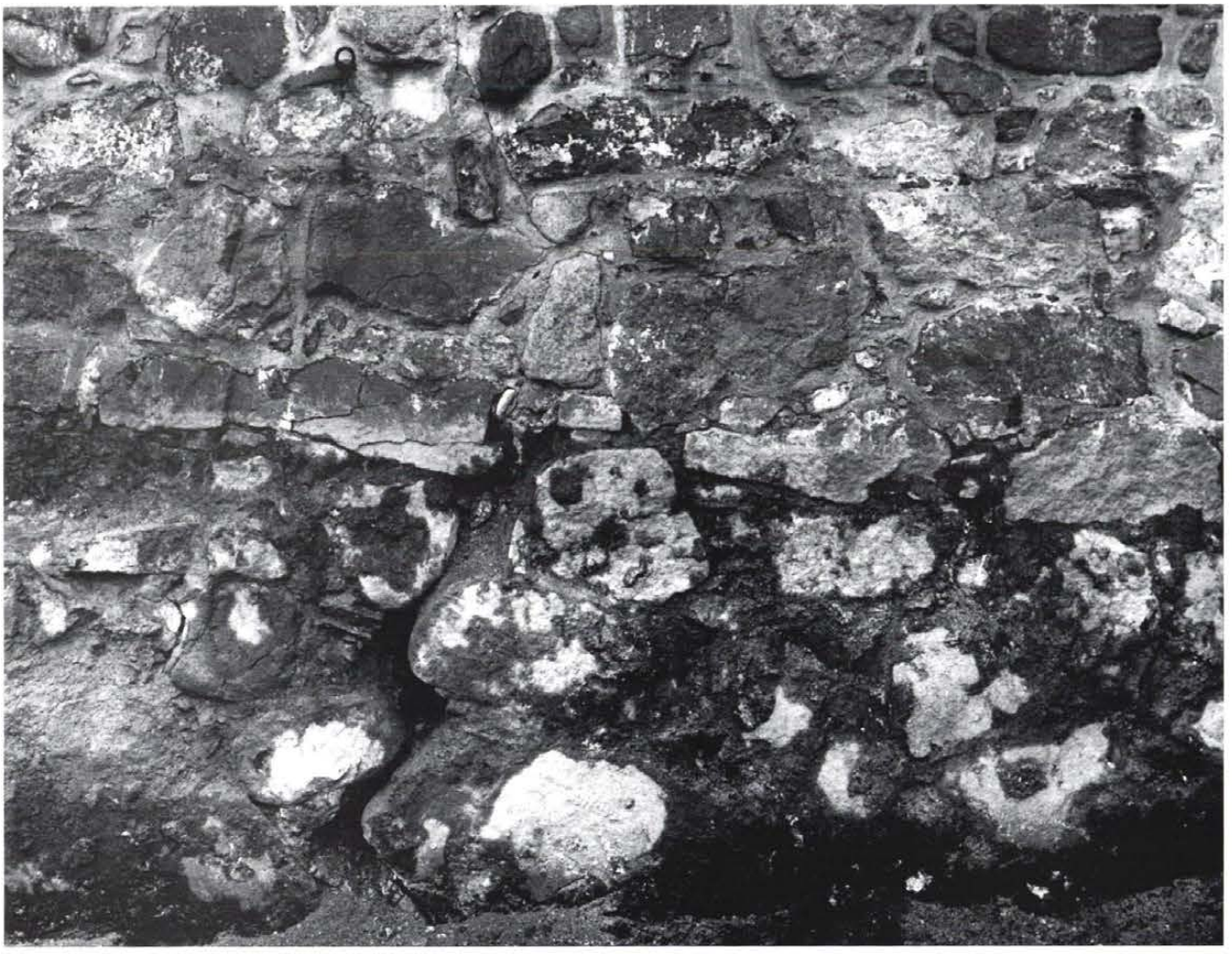

Fig. 17. The structures of the east outer bailey between the hexagonal tower (south tower) and the round tower. In the east section of the wall, the older wall part merges into the newer one without any distinct structural joint. There may be a possible joint at the large upright crack (centre of image), although the upper section is of uniform appearance. (Photograph by P.O. Welin, Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Photo negative 2394)

permitting the whole structure to shift already during its original use. Like the log framework, the wall structure also leans ca. 14-17 degrees towards the south (Plate IX).[1]

The inner face of the older wall structure could be identified with any certainly only at the west end of the wall, where remains of a wall older than the present outer bailey were discovered in two places. The remains indicate that the wall was ca. 260-290 cm thick[2], i.e. clearly thicker than the oldest SW wall, although both components most probably belong to the same structure (Plates VII, VIII).

In the east part of the wall was first a section of wall 8-9 metres long, whose course differed from the present encircling wall. It was interpreted as the remains of older masonry. This feature included ca. 180-250 cm high masonry on top of thelog framework (extending to elevation ca. +320-+400). Lowermost in this part was a stone foundation one course high. The overlaying stone wall was made of relatively large stones at least partly laid in rows.[3]

The most problematic part of the eastern section for the investigation was the central section of the structure itself. Here the older masonry turns to follow the course of the present wall without any visible connection or joint (Fig. 17). However, the subterranean part of the wall next to the round tower at the east end does not differ from the upper structures, and it appears that the wall belonged to the same stage of construction.

It is impossible on the basis of field observations of the 1970s to unequivocally establish the stages of

[1] Soiri & Merikanto 1974.
[2] Soiri & Merikanto 1974.
[3] Willner & Vaurio 1974.

construction of the eastern part[1]. One possible interpretation is that the west end of the eastern section by the south tower is an older wall extending in an unknown manner towards the east or northeast and that the whole upper part of the wall is in fact the same structure as the whole upper part of the wall, i.e. it is clearly younger. Another interpretation is that the lower parts of the walls are old throughout and that some type of horizontal joint in the eastern section has been overlooked or missed in field work (Fig. 17, Plates X, XII).

The wall of the eastern part provides an interesting observation of the medieval ground level in this location. At approximately elevation +200 there is a distinct difference in the condition of the mortar in the wall. Beneath the joint there is a great deal of mortar, while above it there is very little surface mortar and the wedged stones of the wall are visible[2]. The boundary, possibly running at +200, shows at what elevation ground level settled during the period when the wall was in use or at a later stage. This is based on the observation that the mortar joints beneath ground level are usually well preserved, while those above ground level were susceptible to weathering effects and therefore generally in poor condition when found.

3.3.2. The supporting structure of the oldest south wall

On the south side of the oldest wall structure in the west section there was another wall structure, interpreted to be a supporting structure for the oldest wall. A similar supporting structure extended in front of the south tower, but no to the east part of the wall. The supporting structure was built on top of a double log framework, +190-+215 high at the middle section of the wall and +160-+200 next to the south tower. This means that the log framework is slightly inclined towards the east. Overlaying the framework was a 70-75 cm-high foundation part above which was masonry of large stones. The height of the latter feature was ca. 100-110 cm (Plates VIII, IX,XI).[3]

The precise construction of the supporting structure is not known, but field observations suggest that the log framework and the wall were built in a relatively straight configuration and that the older wall had inclined prior to the construction of the supporting features, for the north wall of the support was built to adjoin the inclined older wall and the south wall of the supporting part is almost straight. At the west end, the supporting part is ca. 125 cm wide and roughly 135 cm near the south tower.[4] Assuming that both walls formed a uniform structure, it would definitely have been ca. 400-420 cm thick at the west end and possibly ca. 400-450 cm thick near the south tower. Moreover, it would have clearly tapered.

It is unlikely that the supporting structure was used an actual component of the building, because the enlargement could not have affected the already inclined shape of the upper structures. Therefore it is possible that the support was built when the oldest wall was torn down and a foundation was constructed for the completely new, straighter wall.

3.3.3. The oldest south tower

Excavations in middle section of the south wall in the 1950s and 1970s revealed the outer walls of an older quadrangular tower located at the site of the present south tower (the so-called hexagonal tower). The inner walls of the old tower are situated beneath the foundation of the lowest room in the present south tower, where they were also documented in excavations carried out in the 1970s (Fig. 18).

Excavations in the area beyond the oldest south wall revealed the exterior parts of the west, south and east walls of a rectangular tower. Of these features, only the exterior surface of the south wall was completely revealed. The preserved masonry indicates that the outer south wall was ca. 710 cm long. A double log framework was also revealed in excavations of the south wall, with upright posts beneath the logs, as in the west section of the south wall. The thick logs (diameter 30-35 cm) were at elevations of +0.10 - +0.50.

Overlaying the logs was first a single-course stone foundations, mostly without mortar, followed by a preserved section of wall of ca. 1.5-1.8 metres, with the upper part extending to a height of +310-+330.

[1] Willner & Vaurio 1974.
[2] Willner & Vaurio 1974.
[3] Soiri & Merikanto 1974; Willner & Vaurio 1974.
[4] Soiri & Merikanto 1974; Willner & Vaurio 1974.

Fig. 18. The south wing of the east outer bailey
There are no definite building-archaeological observations that could establish the respective order of building of the oldest south tower (lower left) and the east section of the outer wall, but it is highly probable that both were built in the first stage of construction. (Photograph by P.O. Welin, Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Photo negative 2390)

The size of the stones in the masonry varied considerably and they were laid in rows only in places. The mortared joints were very thick and the mortar partly extended to the face of the stones (Plates VIII, IX,X).[1]

The structures of the south tower were clearly inclined towards the south (the River Aurajoki); for example the surviving part of the south wall leaned by approximately 15-17 degrees. On the other hand, the tower was not tilted along the east-west axis like the adjacent sections of wall (Fig. 20).[2] It appears that the tower was the heaviest structure of the whole south part of the outer bailey and that it had sunk straight down, pulling the west and east sections of the south wall with it.

Only a section of approximately 1.5 metres of the west wall of the tower was revealed. This feature, however, showed that the wall was built at least partly on a double log framework and that it had tilted towards the south by some 15 degrees. In the visible parts, the stones of the wall structure were large with large amounts of mortar in between them.[3]

A section of some 1.5 metres of the masonry of the east wall of the tower was also excavated, clearly revealing the above-mentioned tilting towards the south. Parts of the log frame-work underlying the tower were also revealed in the area north of the masonry feature.

[1] Soiri & Merikanto 1974; Willner & Vaurio 1974.
[2] Soiri & Merikanto 1974; Willner & Vaurio 1974.
[3] Soiri & Merikanto 1974.

Fig. 19. The south tower of the east outer bailey of Turku Castle.
In the foreground are the wall structures of the leaning south tower and to the right of the tower is the log foundation of a support structure demolished during repairs. The picture clearly shows how the old tower leaned more than the support on the south side. It appears that the support structure was built to adjoin the tower that already leaned. A new hexagonal south tower was built on top of the walls of the old tower with the leaning walls as its foundation. (Photograph by P.O. Welin, Archives of the Dept. of Monuments and Sites, NBA. Turku Castle. Photo negative 2426)

The logs, at least in double configuration, extended towards the north while rising clearly.[1] The log frameworks of the east and west walls are at almost the same elevation, which also suggests that the tower remained in straight E-W alignment.

Walls structures of the oldest tower were also found in the lowest room of the south tower, where a double log framework was discovered at elevation ca. +150-+200 that had been depressed to an angle of ca. 15 degrees towards the south, like the other structures of the outer wall. The logs of the frame work are quite large, ca. 30-35 cm in diameter.[2] A log framework covering the whole floor area of a room or building (in double configuration) is a very rare construction method. In most cases old stone buildings were built solely on log frameworks underlying the stone walls. It is possible that the difficult foundation conditions at the site were already taken into consideration in the building stage by installing a log framework covering the whole area of the tower.

[1] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[2] Soiri & Merikanto 1974.

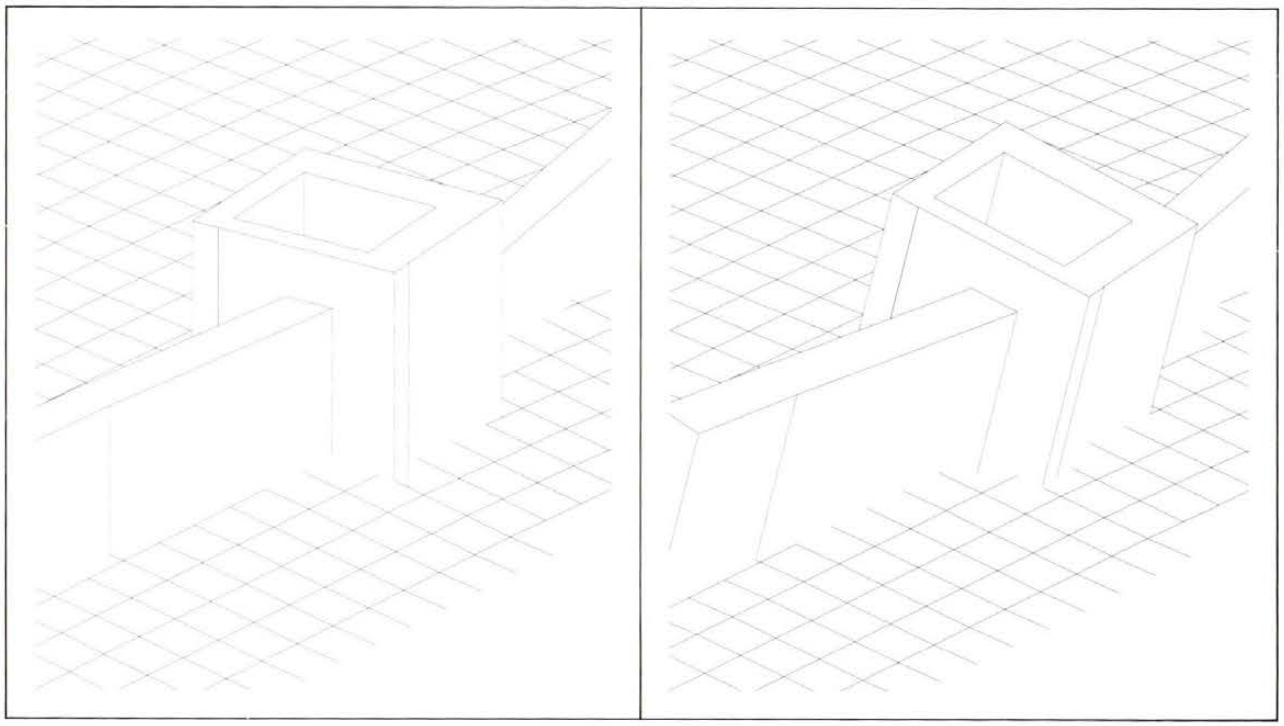

Fig 20. The oldest masonry-built south tower and the west section of the south wall lean by some 14-17 degrees towards the Aurajoki River (14 degrees in the illustration).

Beneath the walls of the present tower were also features that were most probably the inner walls of the oldest tower. The east wall and part of the south wall of the oldest tower were revealed at elevations +200-+250 ca. 50-70 cm behind the present line of the wall, as also the northwest corner ca. 20 cm behind the wall at elevations +280-+320. Discovered next to the doorway of the present room was a part of a wall that was interpreted during excavation to be the northern exterior wall of the oldest tower.[1]

The oldest room in the tower was roughly 23 square metres in area (fig 21). The room measured ca. 510 cm along the east-west axis and roughly 450 cm N-S. It is difficult to establish a connection between the outer and inner walls of the oldest tower, because its west wall was only ca. 70 cm thick, while the east wall was ca. 140 cm and the south wall was 200 cm. Basing on a slightly uncertain observation, the north wall was only ca. 60-70 cm thick[2]. If these measurements are correct, the exterior dimensions of the tower were 710-730 cm (E-W) and 720-730 cm (N-S). (Plate VIII)

It is possible that a thinner outer wall was sufficient in the west and north sections of the tower, because these sides faced the main part of the castle and the forecourt. It is even possible that the tower was open on the inside, like the towers in the town walls of Visby and Tallinn, although there is no definite evidence for this. It is difficult to estimate the height of the tower, but we can note that a wall of 60-70 cm was normally used in only single-storey structures. On the other hand the thickness of the outer walls (140-200 cm) points to at least a two-storey building.

The southward tilt of the west section of the south wall and the oldest west tower was only ca. 14-17 degrees, in which connection the upper structures also clearly shifted towards the south. The surviving low parts of the wall are clearly inclined. Assuming that the wall and the tower were 10 metres high, their upper parts would have leaned some three metres towards the south. In this connection the vaults and timber structures of the walls and the tower were most probably damaged, and it became impossible to use the whole tower. We may also theorize whether the original upper parts of the wall would have remained in place in their new leaning location - most probably they would not have done so. Moreover, the almost three-metre-thick south

[1] Soiri & Merikanto 1974.

[2] Soiri & Merikanto 1974.

wall leaned over half a metre at the top, making its normal use very difficult. The leaning of the tower and the wall part associated with it also led to serious problems for the defence of the whole outer bailey, and repairs were most probably made as soon as possible. The rapid and surprising sinking of the wall is at least indirectly suggested by the fact that no structures would have been allowed to gradually descend 14-17 degrees; repairs would already have been undertaken at an earlier stage (Fig. 20, Plate IX). [1]

3.3.4. The supporting structure of the oldest south tower

As in the west section of the south wall, a log-framework supported support structure or wall extension, surrounding the outer walls of the south tower, was built in the next stage south of the south tower. The supporting structure was built on a double framework of logs, the elevation of which was +075-+1.20, i.e. clearly above the elevation of the log framework underlying the actual tower. All the log frameworks that have come to light were almost horizontal. At the southwest corner of the tower, the log framework of the south wall and the log framework of the supporting part of the west wall of the tower were clearly built at the same stage.[2] This confirms the suggestion that the whole supporting component was constructed in a single stage (Plates VIII; IX:D-D,L-L;XI).

Also preserved was a masonry construction ca. 150-200 cm high on top of the log framework. Lowermost in the south wall is a 100 cm-high foundation of two or three courses of stones in layers. On top of this part is a mortared section of wall constructed of large rectangular stones as in the supporting structure of the south wall. The supporting structure was built to adjoin the clearly sunken south tower and its width is ca. 130 cm at the west wall, 150-190 cm at the south wall and 150 cm at the east wall. The length of the whole west wall is 1020 cm. The outer walls of the supporting part - at least where preserved — are almost upright, which means that they are not inclined like the original structures.[3]

It is difficult to establish the connection of the enlarged section and the eastern part of the south wall on the basis of the surviving excavation documents, although it appears that the eastern part of the wall was built before the supporting section (Plates VIII; IX:D-D,L-L;XI).

3.3.5. Renovations and repairs to the south wall

West section

The supporting structure built outside the sunken and inclined south wall may be an independent building component made to halt the sinking of the actual wall. It is possible that the supporting structure was built to support the inclined south section all the way to the top section of the wall. When the next construction stage began the actual wall and the support would then have been dismantled from elevation +400-+500 upwards. Another alternative is that in the first stage of repairs to the considerably inclined south part a support was built to face the inclined wall and that the actual building work proceeded from this wider foundation. The remaining wall sections suggest that the latter alternative is more probable. Accordingly, the supporting section would never have reached higher than +400 - +500 (Plate XII).

The grey stone wall of the new south section was built in a straighter E-W configuration than the earlier wall and it also forms a right angle with the completely renovated SW wall. Moreover the masonry of the south section is structurally joined also to the renovated south tower (so-called hexagonal tower). At least on the south side the wall was built on old foundations and is ca. 350-400 cm high, extending to elevation +800-+820. In the lower part of the wall are three to four courses of large stones (to elevation +650). Extending upward from these stones is masonry of small stones comprising the whole upper part of the wall. The stones are in rows of some type with wide mortar joints. There are no distinct signs in the wall of tilting; the stones are in relatively straight lines. The stone wall is ca. 300 cm thick at the west end and it tapers towards the south tower, where it is ca. 280 cm thick (Plates VIII, XII).[4]

[1] On the 'behaviour' of leaning buildings see e.g. Parland 1994 and Paatonen 1994. With reference to the possible gradients of the tower proposed by Parland, the south tower and wall should have fallen down at a considerably smaller angle. This can be interpreted as an indication that the actual sinking was a rapid event and not a problem that had developed slowly over the years.

[2] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[3] Soiri & Merikanto 1974; Willner & Vaurio 1974.

[4] Soiri & Merikanto 1974; Willner & Vaurio 1974.

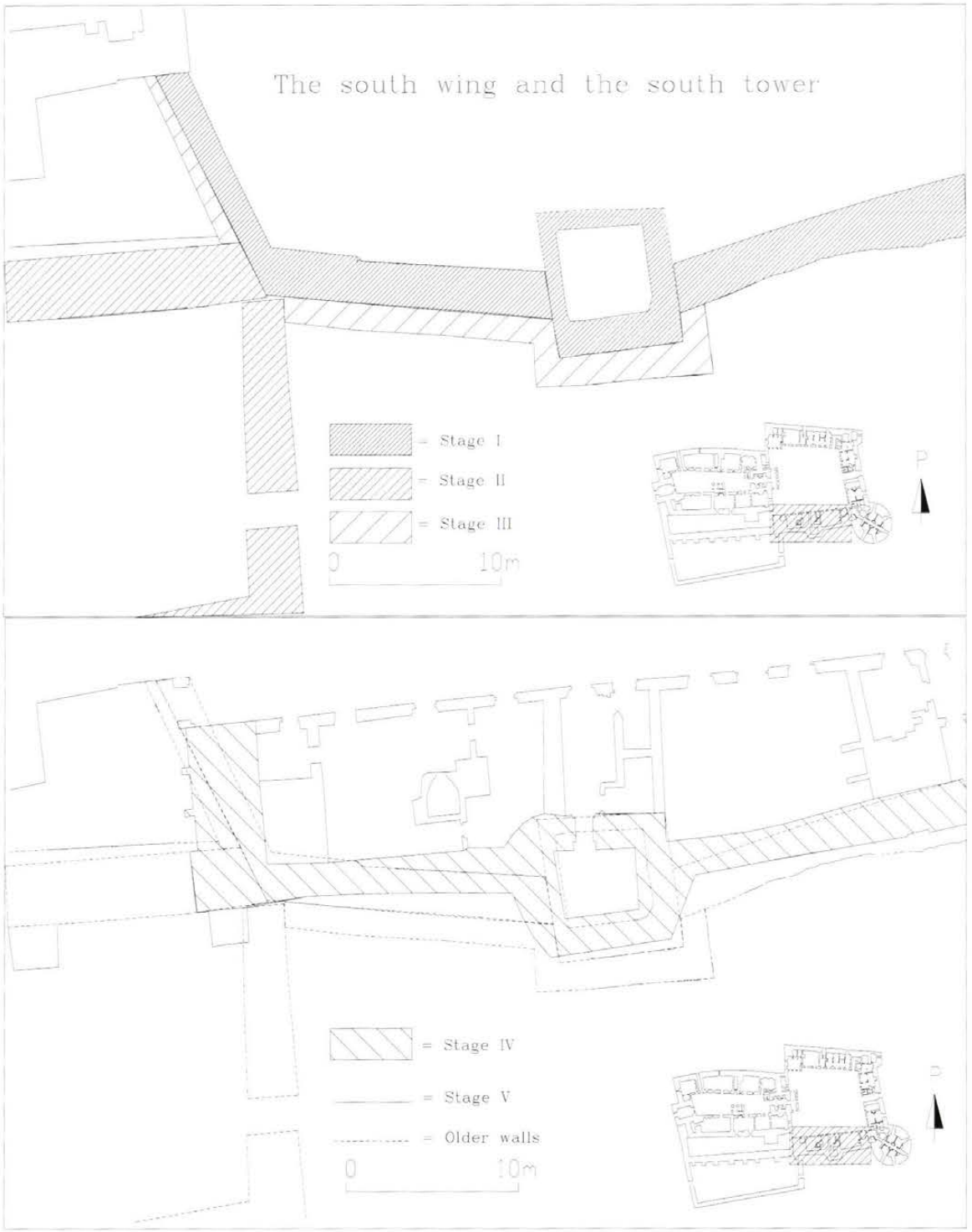

Fig 21. History of construction of the south part of the east outer bailey of Turku Castle (by K.Uotila).

In the middle section of the wall, at elevation +660, are the structures of a later brickwork opening. There are no signs of the later walling up of the gateway of the outer bailey or of other openings.- This means that no preserved structures suggest that there was a gate of the outer bailey near the south tower (Plate XII). [1]

Extending from elevation +800-+850 on top of the stone section is a brickwork wall 5-6 metres high,

[1] The gate and gate tower of the outer bailey are discussed in connection with the historical sources on the outer bailey in chapter 5.5.

extending to elevation +13.70. The wall contains several features of brickwork of different age, but the oldest part most evidently consists of walls of Polish bond[1] with preserved surfaces in the middle section and near the south tower (Plate XII).

There are no structural horizontal joints of mortar in the wall, but there are distinct variations in the rhythm of the overlaying courses of headers, suggesting[2] that the brick wall was built in sections 100-150 cm high. In the wall the size of the bricks could be ascertained only in the central part, where no later building components had been added to the measurements (Plate XII). Accordingly, the size of the bricks varies between 8.5-9 x 15-16 x 29.5-32 cm; most of the bricks measure 9 x 15-16 x 31-32 cm (Figs. 22 and 23) .[3]

The courses of brick in the brickwork wall are horizontal within the parameters of measurement, which means that the brickwork structure has remained in relatively straight configuration since its original construction (at least in E-W alignment). There are no signs of the leaning of the oldest wall, even in the higher parts. Up to elevation +900, the brick wall is ca. 200 cm thick, ca. 150 cm at +1200 and ca. 100 cm at +1300-+1400 (Plates II, III, IV, V, XII).[4]

In addition to the brick section in Polish bond, there are also large repaired and filled areas, most of which are in English bond. The wall contains five windows with segmented arches made at a later date, and one earlier filled opening, which is also younger than the oldest brick wall (Plate XII).

The east section

In the second construction stage, the east part of the south wall was fitted with a new section of wall on the north side of the old structure following the same straighter line as the new west part of the south wall. Moreover, the new wall section is well suited to the structures of the hexagonal tower, and the repairs to the east section are associated with the same construction stage as other restoration work on the south wall. At the west end of the east section the new wall was largely rebuilt and was therefore given a double log framework at elevation +220. The framework was revealed from behind the older wall structure next to the hexagonal tower. The stone structures of the new wall are documented from elevation +440 upwards. The stone wall extends to elevation +780-+800. The size of the stones varies to some degree, being partly laid in rows and including large stones (Plate XII) .[5]

At the east end of the wall is the above-mentioned problematic feature of the connection of the older wall with the upper stone wall, which cannot be definitely resolved on the basis of the available sources. We can assume, however, that also the masonry of the east end was repaired or remortared in connection with the repairs.

The masonry wall of the east part is in relatively straight configuration at elevation +780-800, and above it is an originally Polish bond brick wall roughly 6 metres high, i.e. extending to elevation 1350-+1370.[6] The section of brick wall is not known to contain any niches for timbers, but there are a few irregularities in the upright courses of headers, suggesting that the wall was built in at least three stages or layers ca. two metres in height. There are large areas of repairs in the brick wall, mainly in Polish bond, and a total of five secondary windows (Plate XII).

There were no observations of a distinct structural joint between the grey stone and brick sections of the wall that would had have definitely shown that the wall was built in two stages with the stone part followed by a later brick part.[7] The suggested later date of the brick section is based on C.J. Gardberg's studies.[8]

Accordingly, in the early stage the renewed wall was a stone wall ca. 6-8 metres high with its upper edge roughly at elevation +800. At that stage, ground level was possibly at ca. +200, making the actual height of the wall from ground level ca. 6 metres. At present, the wall is ca. 350-400 cm above

[1] In the Polish/Vendish bond a stretcher alternates with a header. In the Nordic countries and in Finland in particular, this type of brickwork is dated to the 16th century; elsewhere in the Baltic sphere this tradition was already followed in the Middle Ages (e.g. Andersson K.-Hildebrand 1988, pp. 54-55, Bengtsson 1982 p. 12; Ekroll 1997, pp. 68-69).

[2] The upright rows of headers in the medieval brick wall reveals slight displacements along the vertical axis. These may indicate distinct construction stages (as in the brickwork castle of Hämeenlinna) or only joints resulting from the building process (as in the outer bailey of Turku Castle).

[3] Measured drawings of the outer bailey; Soiri & Merikanto 1974; Willner & Vaurio 1974..

[4] Measured drawings of the outer bailey.

[5] Measured drawings of the outer bailey; Willner & Vaurio 1974.

[6] Measured drawings of the outer bailey.

[7] The only research data on this feature are drawings of the walls, which only document the surface structure and do not seek to establish horizontal joints deeper in the wall.

[8] Gardberg 1959 pp. 321-316.

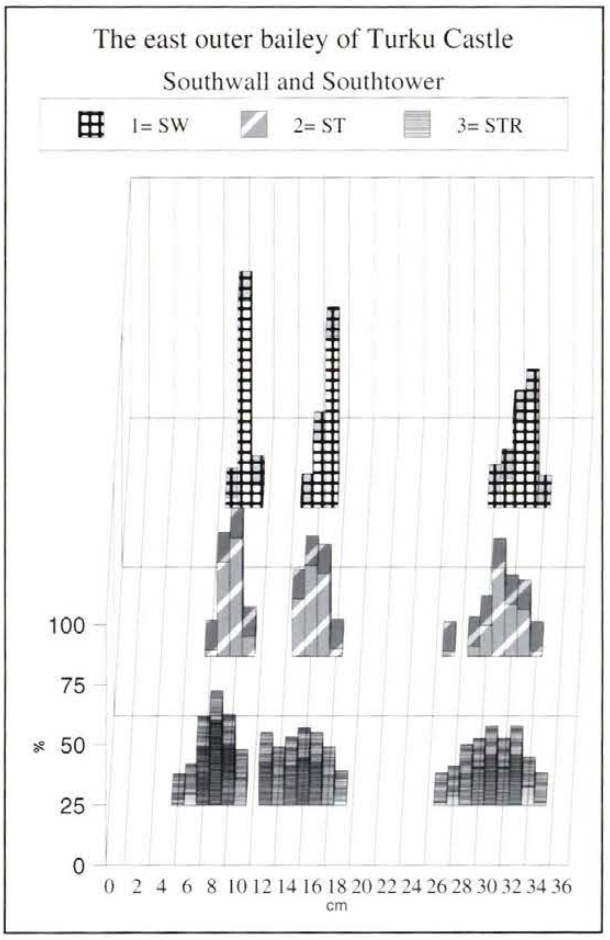

Fig. 22. The east outer bailey of Turku Castle. Comparison of bricks in various components of the south wing.
1 = SW Outside face of the south wall
2 = ST Outside face of the south tower
3 = STR Rooms in all the storeys of the south tower
The first diagram gives the thickness of the studied bricks; the second diagram shows the width and the third gives the length as a percentage distribution. The bricks are measured to the nearest 5 mm.

ground level. It appears that the significant sinking of the walls that took place in this area had already occurred at an earlier stage, because the stone walls had mostly remained in place.

The stone-built wall was thus topped at a later stage by a roughly 550-600 cm - high brick wall (elevation approx. +1350) in Polish bond. If ground level had remained around +200, the wall would then have been 11-12 metres high. Also the brick walls are horizontal, which means that the settling of the outer bailey structures took place before the brickwork parts were built (Plate XII).

3.3.6. The hexagonal south tower

A multi-cornered tower began to be built on top of the older four-cornered tower beginning at elevation +300-+320. The stone tower had as its foundation a course of stones (of exceptionally large size). Overlaying the foundation in the completely excavated south wall is a wall part ca. 2 metres high with even courses of stones that were obviously selected with care. At approximately +500 the masonry of the brick wall begins to vary, extending to approximately elevation +800-+850 (Plate XIII).[1]

The diagonal SW wall was made of large stones laid in rows of a kind. A special masonry technique is indicated by two large stones at elevation ca. +600 (the stones measures ca. 110 x 100 cm and 100 x 100 cm). The stone-built wall extended to elevation +800, although its upper edge is damaged. At elevation +500 in the lower section of the wall is a small brickwork opening, which may be of later date. Like the other walls, the diagonal SE wall was built of stone to approximately elevation +800, at which height are a few large stones located uppermost.[2] The masonry of the tower is structurally joined to the stone-built part of the south wall, which shows that both parts were built at the same time.

The hexagonal tower was built on top of the older tower and its support so that the new tower was slightly shifted towards the west and was located mostly on top of the structures of the support, which may suggest that the whole support was built as the foundation of the hexagonal tower. The south wall of the new tower is approximately 720 cm thick and the diagonal southwest wall is roughly 420 cm thick; the southeast wall is 390 cm. The northwest wall of the polygonal tower is roughly 250 cm long (Plate XIII).

The tower had five diagonal sides and only the northeast corner was at a right angle. It was only in the third storey of the present tower that also the northeast tower was built diagonal and the tower was completely hexagonal. The maximum N-S length of the whole tower is ca. 800 cm and 1020 cm along the E-W axis.

Built in the bottom storey inside the tower is a small room, measuring 360 x 430 cm, i.e .ca. 15 sq.m., which means that it was smaller than the corresponding room of the older tower. The room shows the outer wall southeast and southwest walls of the tower to be 250-300 cm thick, and ca. 220 cm

[1] Measured drawings of the outer bailey; Soiri & Merikanto 1974; Willner & Vaurio 1974.
[2] Measured drawings of the outer bailey.

thick along the south face. The walls of the north face of the tower are approximately 220 cm thick.[1]

The brick upper part of the hexagonal tower

The outside walls of the hexagonal tower (south tower) are of brickwork from elevation +800-+850 upwards. The preserved sections are in Polish bond. The original bond, however, has been preserved only in places – for example only in the central part of the south wall. There are not distinct layers in the brickwork of the south wall. The original wall structure extends to the upper edge of the present tower, i.e. to elevation +1700. In the SE wall the Polish bond is relatively uniform in structure and in only a few places is the rhythm of the bricks broken. The SW wall appears to have been mostly repaired in English bond, and only the very top part of the wall at elevation +1600-+1700 was made in Polish bond and it apparently belongs to the oldest brickwork of the structure. The connection of the brick component of the south tower with the adjoining brick walls of the south wall points to contemporaneous construction. In other words, there is no distinct joint (Plate XIII).[2]

Figs. 22 and 23 present a compilation of the sizes of bricks in the various building components.[3] In the south wall, it can be seen that brick size is uniform throughout the wall section. On the other hand, there is slight variation of brick size in the outer wall of the south tower, which is explained by the fact that when measurements were taken a secondary window was associated with the older brickwork of the south wall of the tower, This most probably accounts for the variation of brick size.

On the other hand, there is considerable diversity in the size of the bricks in rooms E 207, E 307 and E 407 inside the south tower. It can be suggested that there were several construction stages in the interior parts of the tower. In the top storey of the tower (fourth floor = E 407) the bricks are highly similar in size to those in the outer walls. In the lower rooms, E 307 and E 307, distinctly smaller bricks were used. Observations in room E 207 revealed that the wall was originally built in so-called double-stretcher Flemish bond (two stretchers + one header).

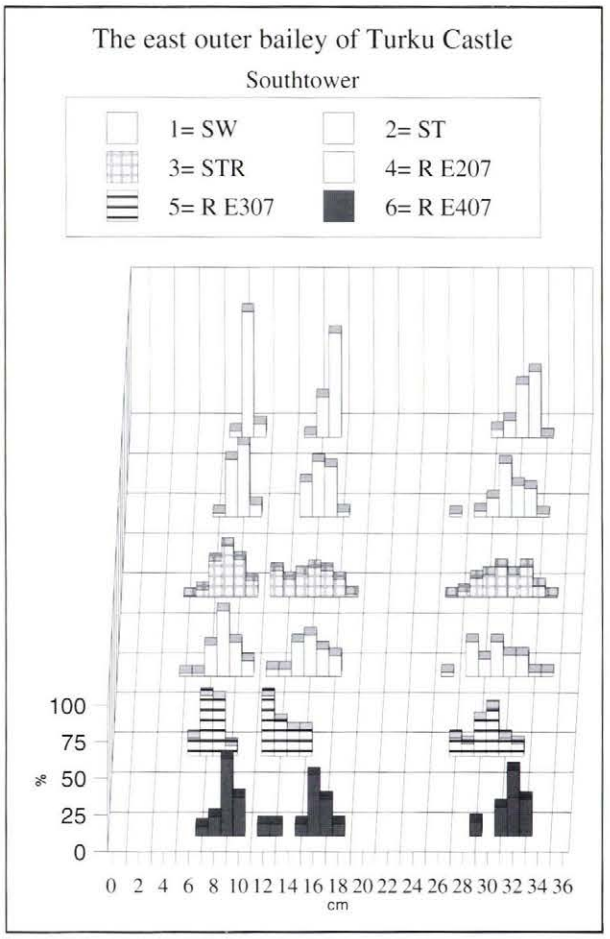

Fig. 23. East outer bailey of Turku Castle. Comparison of brick size in various components.
1 = SW Outer face of the south wall
2 = ST Outer face of the south tower
3 = STR Rooms in all the storeys of the south tower
4 = R E207 Room E207 in the south tower
5 = R E307 Room E307 in the south tower
6 = R E407 Room E407 in the south tower
(Numbering of rooms given in Appendix 1.)

This brickwork and the smaller bricks possibly extended to the room on the third storey (E 307).[4]

As further investigated details are lacking, we can only assume that in the first stage a stone or brickwork shell was built up to the present third storey, i.e. some three metres higher than the actual wall and that the rooms E 107, E 207 and E 307 of the interior are at least partly of medieval build. The present exterior of the tower and parts of the interior were built when the whole south tower was raised with the addition of a brickwork part. Also in this stage, the tower extended ca. three metres higher than the actual wall.

[1] Kajala 1977-1986; Measured drawings of the outer bailey.
[2] Kajala 1977-1986; Measured drawings of the outer bailey.
[3] Brick size in the outer bailey structures was compared by recording the bricks of the measured features and by calculating the percentage distribution of size in the respective structures.
[4] The measurements of the bricks are compiled from the measured drawings of the outer bailey and from Kajala 1977-1986.

3.3.7. Remains of the south wall beneath the round tower

The masonry and brickwork of the south wall clearly continue beyond the wall connection of the SW part of the round tower, and it is obvious that the round tower is of later date than the structures of the south wall. The construction of the round tower in the 1560s was an obviously massive endeavour. At that stage large sections of the older south wall and the SE tower were torn down.

In 1959 two wall structure features were discovered at the connection of the round tower and the south wall. Of these, the apparently exterior surface of the south wall was made of unworked stone to at least elevation +580. The construction of the wall from that point upwards is not known. The masonry wall surface is smoothly worked and there are several bricks among the wedges. The exterior wall of the round tower was apparently built adjacent to the wall. The revealed surface of this structure is of uneven masonry and it clearly stood apart with regard to its masonry technique (Plate XIV).[1]

Excavations in 1959 revealed structures of the original south wall from beneath the central passageway of the ground floor of the round tower. Situated at the very bottom was a simple log framework foundation at elevation -040-+030, which was overlaid by the masonry of the exterior wall surface at elevation +030-+110. At its highest, three courses of stone remained in the stone wall, which was overlaid by the log frameworks of the foundation of the round tower at elevation +110-+210. The depth of the older wall at 1.5-2 metres beneath the foundation of the round tower suggested that the older structures had either sunk markedly in the past or had been originally built deep underground (Plate XV).[2]

In 1961-62 structures belonging to the south edge of a brickwork opening were discovered next to the entrance of the round tower. This feature was at elevation +250 and consisted of three superimposed layers of bricks. The brick opening had originally been some two metres above the foundation of the wall. The opening was bricked up before the round tower was built (Plate XVI:Plan).[3]

Beneath the floor of the NE part of the round tower were parts of a wall running mainly SW-NE: At the time of discovery, these features were interpreted as part of the original wall structure. These is no other information on the masonry, but it must be noted that the discovered section of the wall is in no way congruent with the structures of the oldest SE tower, as the distance between the window in east wall of room D 108 within the SE tower and the structure interpreted as the outer wall is some four metres (Plate XV). This suggests two construction stages for the outer east wall in the area of the tower. The window was associated with the first stage and the widened outer wall was associated with the second stage. [4]

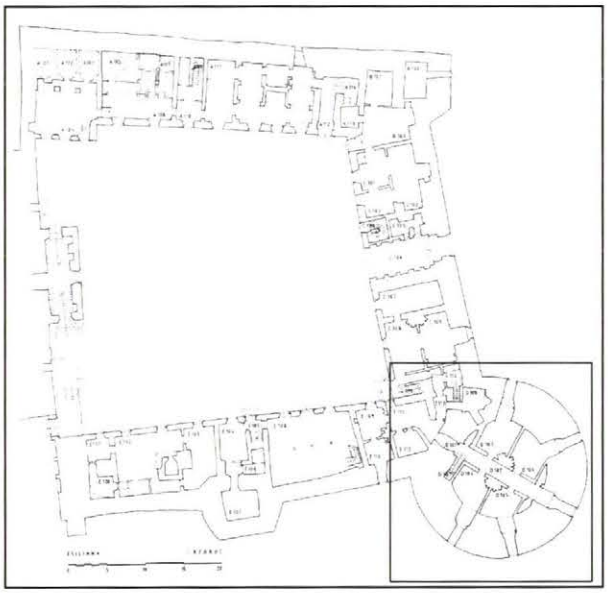

Fig. 24. The southeast tower of the east outer bailey of Turku Castle.

3.4. The Southeast Tower

3.4.1. The older SE tower

At the SE corner of the outer bailey is the older SE tower located beneath and adjacent to the structures of the round tower (Fig 24). Both Juhani Rinne and Carl Jacob Gardberg placed the older SE tower in the small room located north of the round tower (D 108)(Plate II).[5]

Beneath room D 108 is the so-called "well cellar" (D 008), which was first investigated in the late 1950s and again in the 1980s. The investigations revealed in room D 008 a double log framework at elevation D 008, which, as in the other older towers (such as the oldest south tower and the NE tower) covers the whole floor area of the room. Along the

[1] Round tower 1959-1962.
[2] Round tower 1959-1962.
[3] Round tower 1959-1962.
[4] Round tower 1959-1962.
[5] Gardberg 1959, p. 428; Rinne 1938, pp. 323-327.

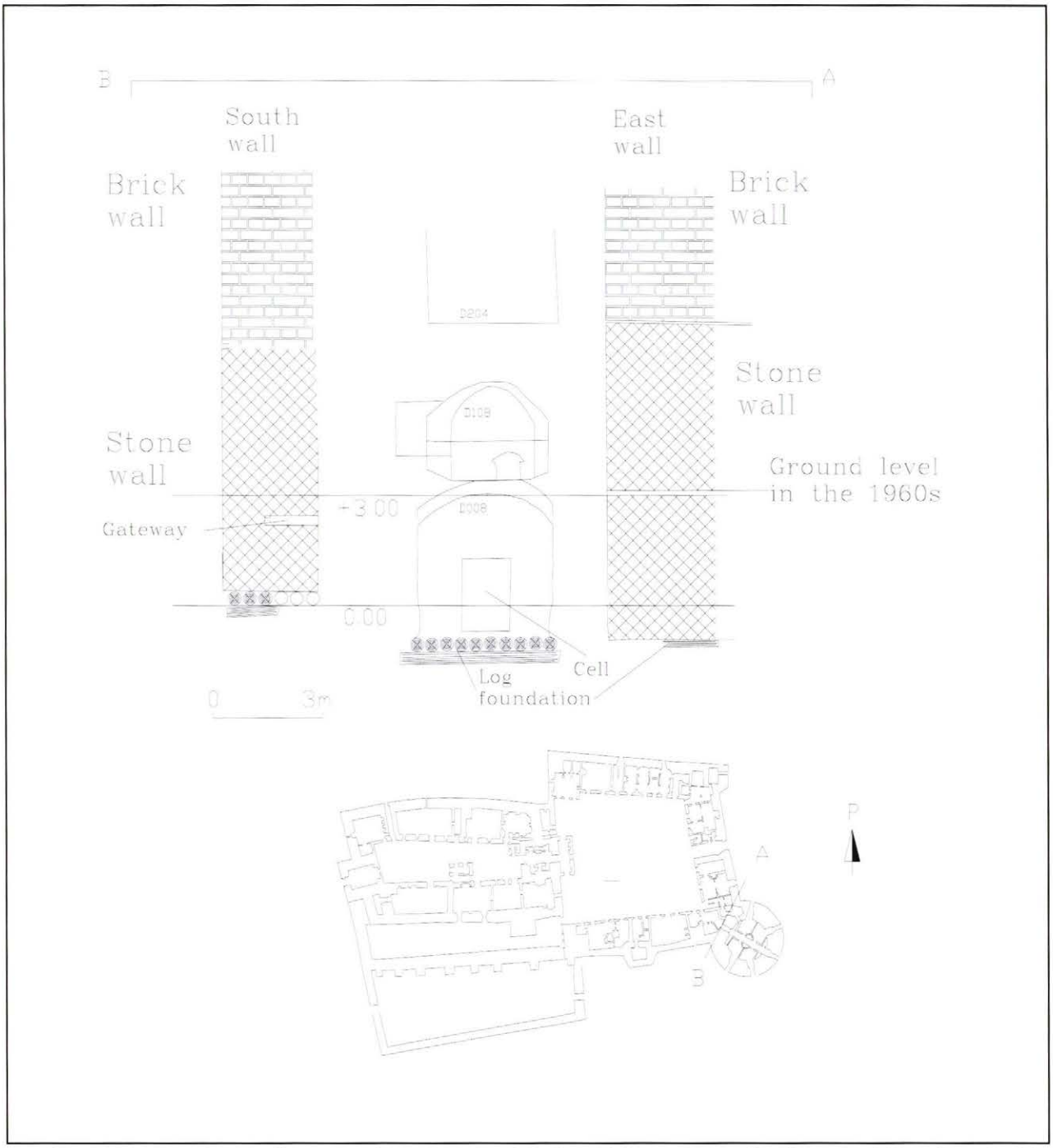

Fig. 25. The east outer bailey of Turku castle. Building-archaeological data on the walls of rooms D008 and D108 of the southeast tower and other older walls in the area of the round tower. Section. (Illustration by K. Uotila)

N-S axis the log framework was almost horizontal, but it was inclined towards the east by roughly 8-9 degrees. The same inclination could also be observed in the vault of cellar D 008 and in the masonry structures of room D 108 located above it (Plates II, III, XVI).[1]

Overlaying the log framework is approximately 290 cm of masonry, followed by a barrel vault of brick, approximately 100 cm high, making the whole cellar roughly 390 m high. In the east part, the cellar is at an elevation of -090-+300, and in the west section it is at -040-+350, i.e. the masonry wall begins at approximately +1.00 a.s.l.[2] This height for a masonry structure can only indicate a significant sinking and leaning of the room as the cellar should at the time of construction have been at least at an elevation of +200-+250, i.e. at least three metres higher than at present. The oldest entrance is in the NW corner of the cellar, with a 70 cm-wide passageway leading NW. This feature contains a horizontal brick barrel vault at elevation +420,

[1] Kajala 1977-1986.

[2] Kajala 1977-1986.

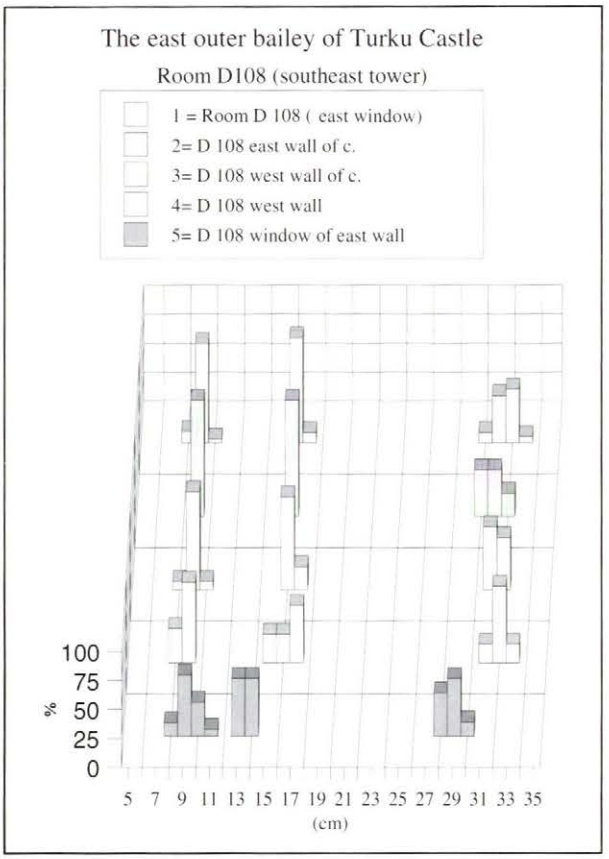

Fig. 26. The east outer bailey of Turku Castle. Size of bricks in various structures in room D 108 of the southeast tower.
1= Room D108 without window of the east wall
2 = D 108 c. east wall of the corridor
3 = D 108 c. west wall of the corridor
4 = D 108 west wall
5 = D 108 window of the east wall
(Numbering of the rooms given in Appendix 1)

which means that the ceiling of the passageway was roughly 70 cm higher than the vaulting of the cellar (Fig. 25, Plate XVI).[1]

In the middle of the cellar is a log well built directly on top of the original log framework. The well is roughly 200 cm deep and approximately 200 x 200 cm in area. Its upper edge is at approximately +120, the same elevation as the wooden "drain pipe" in the south wall of the cellar.[2] It appears that the well and the pipe are later features of the cellar and are possibly associated with changes in humidity in the tower. This is also suggested by the fact that the timber structure of the well had not sunk like the log structure beneath it, but was mostly horizontal (Plate XVI).

Room D 108 is located on the next floor of the tower. At present, it is a small room tapering towards the east and measuring roughly 120-170 x 150 cm. In the east wall are the remains of a broken brickwork window. The original window most obviously opened towards the east, but the later wall of the round tower blocked the whole opening. In the south wall of the room is a section of a brickwork passage extending SE and broken off by the later wall of the round tower. The lower parts of the walls of the room were made of stone (ca. 100 cm) up to elevation +450. The stone section is followed by brickwork, on top of which, at elevation +500, is a barrel vault of brick extending to elevation +600. At present, the south wall of the room is out of alignment, but the preserved structures show that the east wall originally extended approximately 25 cm to the south, suggesting that the south wall, like the other walls, was almost straight and the room was almost rectangular. Also the doorway in the west wall of the room was narrowed at a later stage. The structures of the lower parts of the room are inclined towards the east at an angle of roughly 7-8 degrees, like room D 008 located below. The only exception is the header-brick vaulting which runs almost horizontal.[3] It appears that the sinking of the structure was already noted when the room was built. This suggests that the vault was a later component than the other parts of the room and was associated with repairs subsequent to the sinking of the structures. Two distinct construction stages are also suggested by the clearly different brick material in the window and vault of the cellar.

Brick sizes of the various building components of the SW tower are compiled in Figs. 26 and 27. The diffuse nature of the material clearly shows that the room contains components made of different types of brick. Upon closer observation it can be seen that the brick surrounds of the window in the east wall of room D 108 differ completely from the brickwork of the rest of the room. This is in agreement with other observations of structural features and confirms the general idea of two distinct stages of construction in the SE tower. Added to figure 26 is the material of the brick staircase of the SE tower, which shows that the later construction stage extended from room D 108 also to the upper parts of the tower.

Rooms D 008 and D 108 are only partly superimposed; measurements show that D 008 is some 100 cm to the west of the room above. Moreover, D 008 measures approximately 340 x 370 cm and D 108 was originally ca. 270-320 x 300 cm. The doorway in the west wall of room D 108 most probably belonged to the structures of the earlier tower; the door leads to room E 113. The east wall of this room is covered by thick plaster,

[1] Kajala 1977-1986.
[2] Kajala 1977-1986.
[3] Kajala 1977-1986.

but it contains indications of stone masonry (the wall as a whole is undocumented). A small trial section excavated in room H 113 shows that the outer wall of the old tower was of stone to as deep as elevation +150 beneath floor level. It is highly possible that the wall was originally the outer wall of the SE tower, and that it faced the courtyard. A passageway or staircase apparently led from the lower floor (D 008) to a location next to the doorway of room D 108. On the north side of room E 113 (in room C 112) a steep brick staircase (D 203) leads to the next floor of the tower. The staircase is in Flemish bond and in its west wall is a window originally opening onto the west, which was later converted into a recess. The stairs led to the top storey of the SE tower - room D 204 (Fig. 28, Plates II, III).[1]

Rooms D 008 and D 108 are only partly superimposed; measurements show that D 008 is some 100 cm to the west of the room above. Moreover, D 008 measures approximately 340 x 370 cm and D 108 was originally ca. 270-320 x 300 cm. The doorway in the west wall of room D 108 most probably belonged to the structures of the earlier tower; the door leads to room E 113. The east wall of this room is covered by thick plaster, but it contains indications of stone masonry (the wall as a whole is undocumented). A small trial section excavated in room H 113 shows that the outer wall of the old tower was of stone to as deep as elevation +150 beneath floor level. It is highly possible that the wall was originally the outer wall of the SE tower, and that it faced the courtyard. A passageway or staircase apparently led from the lower floor (D 008) to a location next to the doorway of room D 108. On the north side of room E 113 (in room C 112) a steep brick staircase (D 203) leads to the next floor of the tower. The staircase is in Flemish bond and in its west wall is a window originally opening onto the west, which was later converted into a recess. The stairs led to the top storey of the SE tower — room D 204 (Fig. 28, Plates II, III).[2]

Room D 204 has been described as part of the older SE tower.[3] Part of the walls are clearly the result of repairs, which means that the room may not belong to the older tower. Moreover, there is a 170-200 cm-high structure between rooms D 108 and D 204, located above each other, of which nothing is known. Room D 204 is to the east of room D 108 located beneath it. The floor of room D 204 is approximately at elevation +760, which

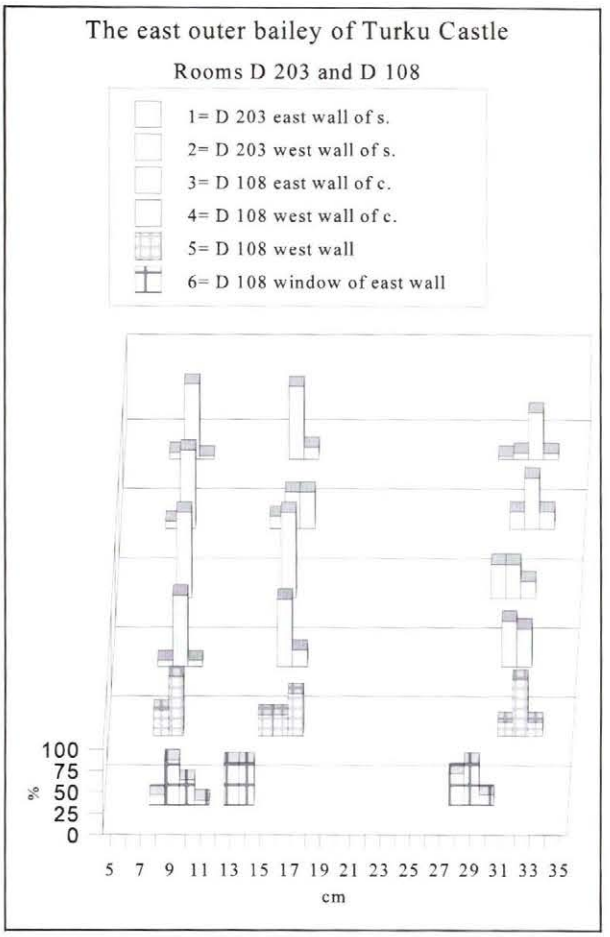

Fig 27. The east outer bailey of Turku Castle. Size of bricks in various components (D 203 and D 108) of the older southeast tower.
1 = D 203 east wall of the stairway
2 = D 203 west wall of the stairway
3 = D 108 east wall of the corridor
4 = D 108 west wall of the corridor
5 = D 108 west wall
6 = D 108 window in the east wall
(Numbering of the rooms given in Appendix 1.)

means that it is completely above the stone-built part of the east wall of the outer bailey (Fig. 28).[4] In summary it can be said that beneath the round tower and in the structures are the remains of older wall structures including a possible opening flanked with brickwork. On the north side of the round tower are indications of an older structure — most probably a tower known from 16th-century sources. It appears t o have had three storeys with access to

[1] Kajala 1977-1986.
[2] Kajala 1977-1986.
[3] Gardberg 1959, p. 428.

[4] The several construction stages of the SE tower are also attested by a section of wall running approximately SW-NE that was discovered in 1959 beneath the floor of the NE part of the round tower.

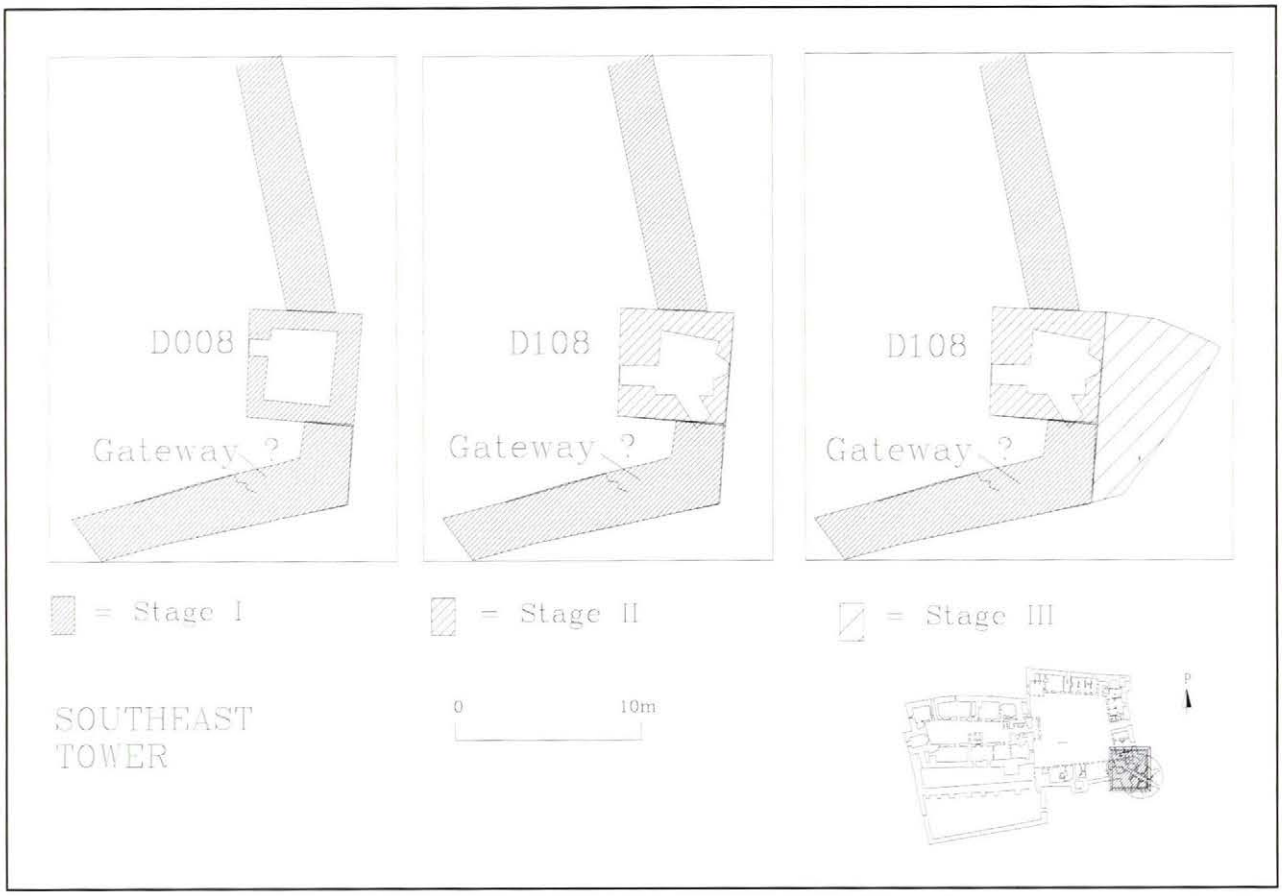

Fig. 28. The east outer bailey of Turku Castle. History of construction of the older southeast tower and its connections with the south wall. (Illustration by K. Uotila)

them from the courtyard. Like the oldest south-tower, the tower was built on top of a log framework covering the whole base area of the structure. It appears that the SE tower was built in several stages, although there are only indirect observations pointing to this.

3.4.2. The round tower

The round tower was built on top of a log framework of several layers located at elevation +100-+200. The log framework appears to have been relatively level. The round tower does not appear to have leaned towards the east in the same way as the older SE tower. The lower part of the round tower was built of stone up to elevation +600-+700. This part was followed by brickwork extending to +1250, i.e. a brick section approximately 6-7 metres high. Also the stone and brick parts are mostly level, and there are no signs on sinking as in the older components.[1] The tower originally had two storeys, and was thusa component lower than the rest of the outer bailey. Historical sources date the tower to the 1560s.[2]

3.5. The East Wall

The archaeological investigations of the east section and their history are the weakest link in the whole chain of studies concerning the outer bailey (Fig. 29 and 30). Major foundation works were carried out in the east wing in the 1950s and '60s, but they appear to have been supervised only partly.[3] The north section of the wall was excavated in the 1970s, but owing to lack of time, the sections of wall were only photographed for later measured drawings.[4] This work, however, was unsuccessful and the documen-tation can no longer be used for detailed studies. For the purposes of this study, the east wall of the outer bailey is divided into two parts, respectively north and south of the gate tower.

[1] Kajala 1977-1986; Round tower 1959-1962.

[2] Gardberg 1959, pp. 427-433.

[3] On the conflicts of repairs and investigations, see e.g. Kajala 1993 and Kijanen 1993.

[4] East and north wings 1974-1977.

3.5.1. The south section of the east wall

Random field observations show that the south section was built on a log framework foundation at elevation -100. Overlaying the framework is stone masonry extending to elevation +700, making the stone-built part ca. 870 cm high. At present roughly half, ca. 420 cm, is visible above ground level.[1] It is characteristic of the whole east wall that most of the stone-built section is below ground level. The wall is made of stones of different size placed in courses. There are thick mortar joints with large numbers of wedge stones. The wall appears to have been built in a single process — at least the section above ground level (Plate XVII).

Overlaying the stone section is a brickwork section in Polish bond. This part is approximately 600 cm high, extending to elevation +1400.[2] The connection of the stone and brick sections is relatively straight and there are no definite archaeological observations of a joint between the different materials; the interpretation of two separate parts is based on historical sources.[3] The brick section includes indications of having been built in several layers, of approximately 100 cm-high parts at a time. The wall contains eight secondary windows and the arch of one older window at its northern extremity (Plate XVII).

3.5.2. The gate tower

The masonry in the lower part of the north and south sections of the east wall was dismantled when the present gateway and gate tower were built; the brickwork in connection with the gateway was clearly built amidst a damaged masonry section. In the middle of the brickwork is a gateway approximately 250 cm wide and ca. 290 cm above present ground level (elevation +580). Above the gateway is a second arch, at +690, followed by a granite slab. From approximately elevation +750 upwards, the Polish bond of the brickwork of the tower appears to be bonded with the south and north sections of the east wall. Although the connections of the south section and the gate tower cannot be observed with any certainty, there are no indications of a vertical joint linking the components. The north section is jointlessly linked to the brickwork of the tower. All this suggests that the gate tower and the

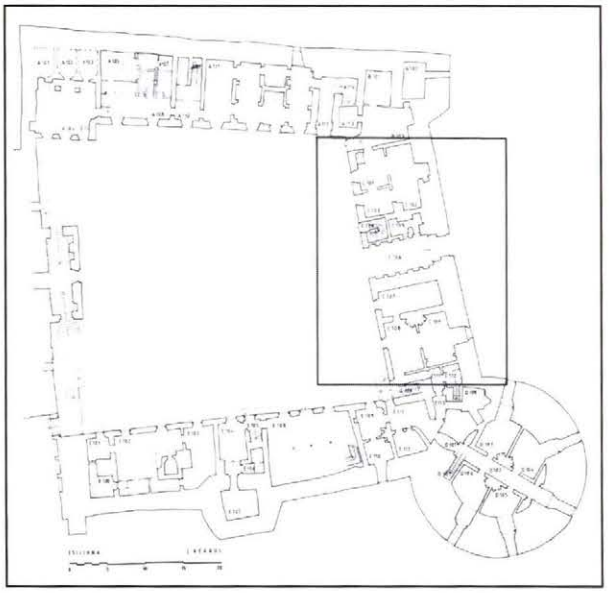

Fig 29. East wing of the eastern outer bailey of Turku Castle.

brickwork of the north and south sections of the wall were built in the same stage (Plate XVII).[4]

3.5.3. The north section of the east wall

The stone-built wall

The stone-built wall was built on a double (in places triple) log framework at elevation -100--050. The logs appear to be inclined towards the interior part of the wall (west), i.e. in the opposite direction than elsewhere in the outer bailey. For example in the south section and the SE tower, the corresponding incline is towards the outside (i.e. south and east) (Plates XVIII, XIX).[5]

Overlaying the log framework is the foundation of the wall structure. The actual height of this feature, however, is not known. Photographs show the stone wall from elevation +100 upwards, leaving an approximately 150 cm-high unknown wall section. In the lower part of the visible stone-built section is a stone structure at +100-+150 which is covered in thick surface mortar, making it impossible to ascertain the precise size and shape of the stones. Overlaying the mortared part is a section of stone-built wall at +150-250, which appears to lack wedge stones. Instead, the wall contains a great deal of humus and clay among the stones. From +230-+250 upwards, the wedge stones are also to be found in

[1] East and north wings 1974-1977.
[2] Measured drawings of the outer bailey.
[3] Gardberg 1959, pp. 312-316.
[4] Measured drawings of the outer bailey. Cf. Gardberg 1959, pp. 304-306. According to Gardberg, the gate tower was built in 1562 and the exterior walls were raised in 1563. There is no distinct joint in the structures.
[5] East and north wings 1974-1977.

Fig. 30. East outer bailey of Turku Castle. Repairs to the east wing and northeast tower in 1975. Present ground level is shown by the mortar-covered surface of the stone walls. The south wall of the northeast tower was clearly built jointed to the east wall on the left. Detailed investigations of the tower showed that the behind the present angled wall is the original straight south wall. (Archives of the Dept. of Monuments and Sites, NBA, Turku Castle. Photo by P.O. Welin)

the mortar seams, as in the part above present ground level. The visible stone-built part is made of stones of different size, and in places there is a bond formed by a courses of larger and smaller stones in some kind of rows. Uppermost in the wall, at elevation +600-+680, is a feature three stone courses high (ca. 80-100 cm) which appears to differ from the rest of the wall. Here, all the stones are large and laid in distinct rows. The stone wall as a whole is approximately 800 cm high from the log framework to its upper edge (Fig. 30, Plate XVII).[1]

It is possible that the distinct structural difference between the mortared and earth-mixed sections is associated with the original soil layers at the site. Accordingly, the parts of the wall at elevation -100-+150, which were originally below ground level, survived in weathered form, while at +150-+250 the wall was most severely weathered in the parts above ground, which were exposed to the elements for a long period.

The brick wall

As in the other walls of the outer bailey, a brickwork part was built here (from approximately +680-+700) in Polish bond. It extends to elevation +1420, and is thus approximately 700-750 cm high. Surviving in places in the brickwork are the niches used for timber scaffolding in the wall. There are 15 niches, eight of which are in a straight line at elevation +1050. These eight hollows are all in the same row of bricks at intervals of 80-190 cm. There are several niches near the gateway tower and the NE tower, and in the middle section of the wall at almost 2-metre intervals. There are also random signs of log niches in the wall indicating that the distance between the scaffolding was 75-100 cm, or 7-9 courses of bricks.[2] The niches are at elevations +850-+1050 and do not extend over the whole wall surface (Fig. 35. Plate XVII).[3]

[1] East and north wings 1974-1977.

[2] Measured drawings of the outer bailey.

[3] In most cases, the niches for scaffolding timber sys-tematically cover the whole wall surface. It is possible that the niches were destroyed at a later stage in the other parts of the wall, but it is also possible that some external timber structure of the period of use was connected to the niches.

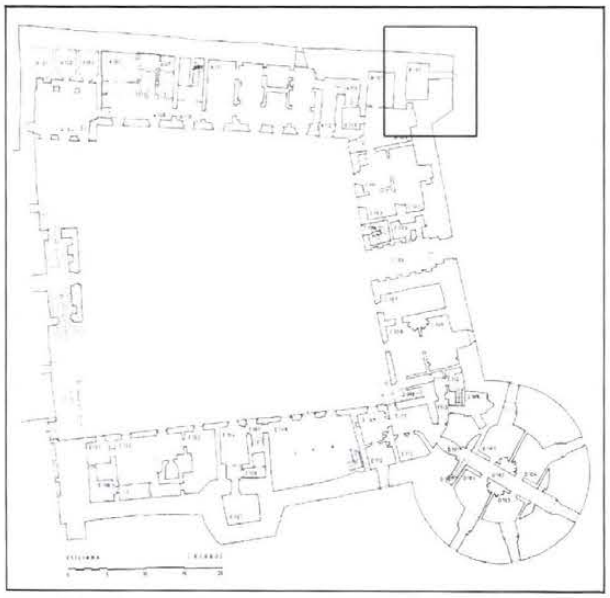

Fig. 31. The northeast tower of the east outer bailey of Turku Castle.

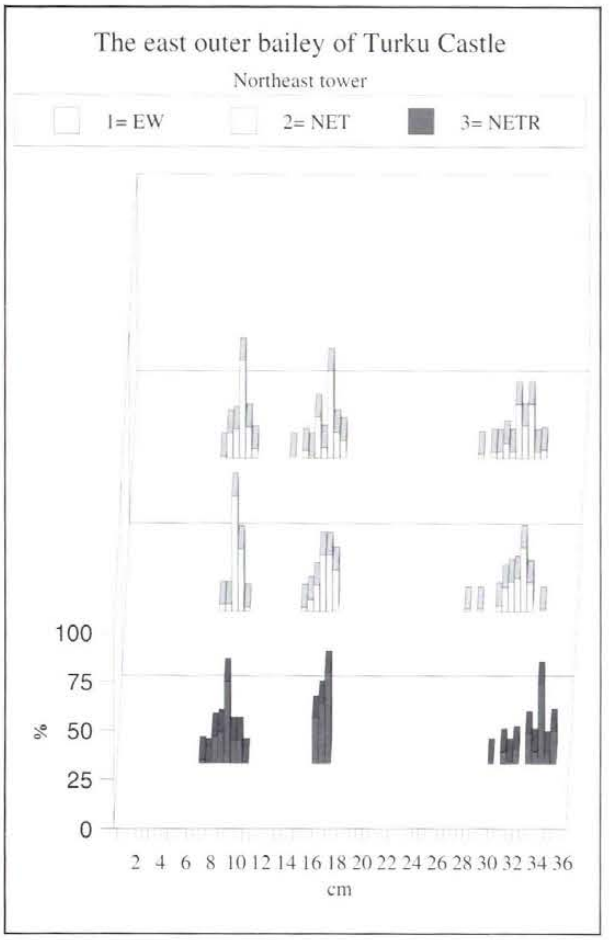

Fig. 32. East outer bailey of Turku Castle. Size of the bricks used in the northeast tower and east wall.
1 = EW outer face of the east wall
2 = NET Outer face of the northeast tower
3 = NETR Rooms of the northeast tower

3.6. The Northeast Tower

At the NE corner of the outer bailey is at present a brick-built tower with bevelled corners, which was regarded as the original NE tower in earlier studies. Excavations conducted in the 1970s, however, revealed within the present tower and older, and an originally four-cornered tower (Figs. 30 and 31).[1]

3.6.1. The older northeast tower

The lowest room, B 102, of the rectangular NE tower, was built on top of a double log framework covering the whole floor area of the room. The log framework is almost level in the N-S direction at elevation -250--180 and in the E-W direction it is inclined towards the west by a couple of degrees, being at elevation -270--190 at the west corner. Overlaying the framework is a foundation of one course of stones followed by the masonry, which is made of stones of various size mainly laid in lines.[2] Located at elevation +180 are niches for timbers in the south and north walls. These niches may have supported an intermediary floor, whereby the lowest room was quite high, 350-360 cm. Above the possible intermediary floor was a vaulted room, in which the vaulting extends to elevation +450-+460. The original height of this room would thus have been ca. 280 cm. The lowest room in the tower was thus around 620 cm high, making it the highest room in the whole outer bailey. The floor area is roughly 470 x 300 cm, i.e. approximately 14 square metres (Plates XXII, XXIII) .[3]

The outer walls of the NE tower are presently the diagonal brick walls, but the outer walls of the earlier tower were excavated from beneath the present walls. Beneath the diagonal SE wall of the northeast tower is the straight south wall. The wall was built on top of a double log framework located at elevation -200--120 on top of which are five stone courses of remains of the straight south wall (ca. 200 cm). This wall section was apparently joined structurally to the north part of the east wall, which

[1] E.g. Gardberg 1959, p. 72; Kronqvist 1947, p. 58; Rinne 1938, pp. 323-328; cf. Kajala 1993, pp. 28-31.

[2] East and north wings 1975-1977; Kajala 1977-1986.

[3] East and north wings 1975-77; Kajala 1977-1986.

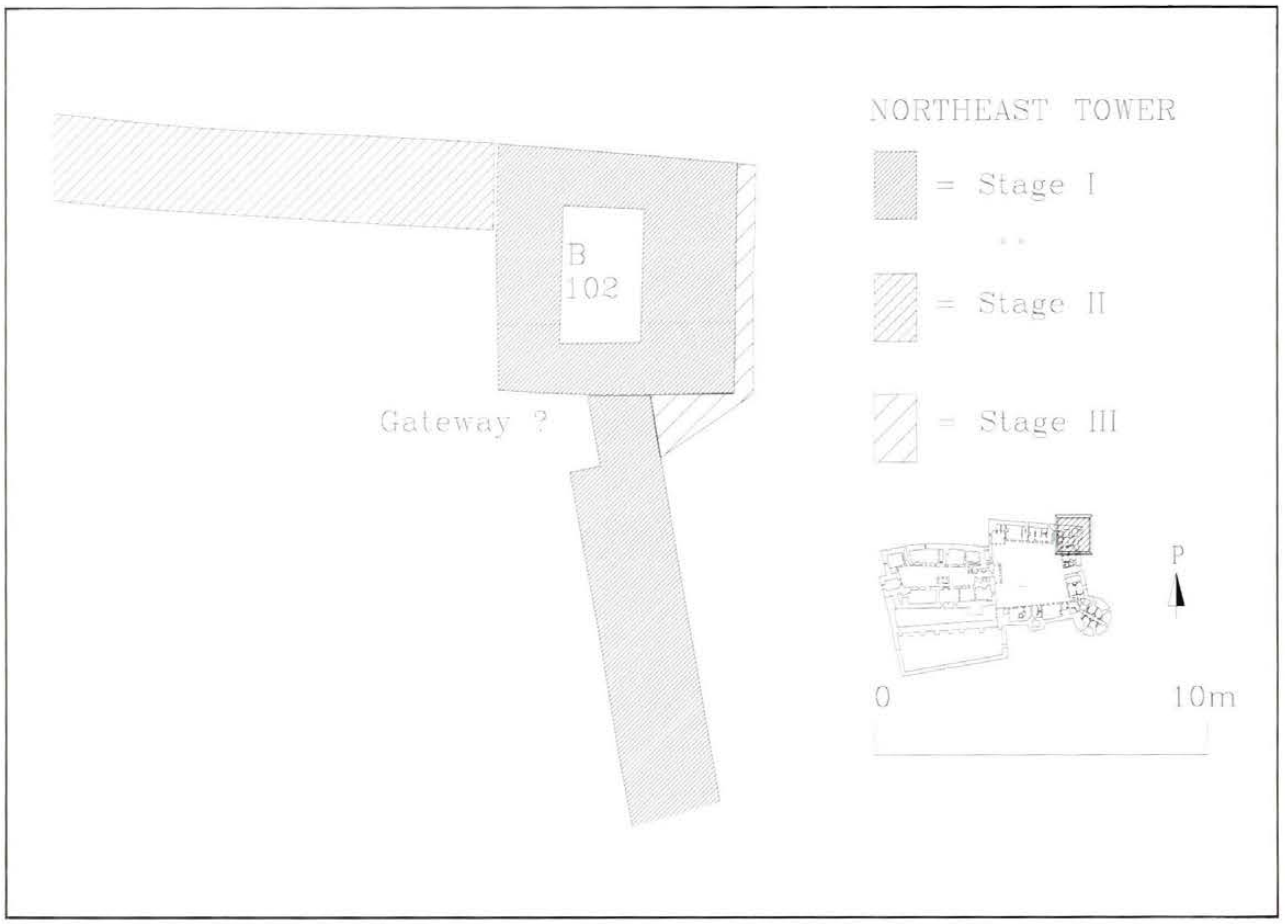

Fig. 33. History of construction of the northeast tower of the east outer bailey of Turku Castle. (Drawing by K. Uotila)

also extends beneath the SE wall of the later tower. The new diagonal wall was built on top of a log framework and stone foundation at elevation ca. +000. From there on, the wall is of stone for at least one metre upwards. This section is followed at elevation +200-+600 by a wall area covered with plaster that could not be documented (Plates XXIII, XXIV, Fig. 30).[1]

Like the other components, the oldest section of masonry in the east wall of the NE tower was built upon a double log framework situated at -200--150. On top of this feature was a stone wall that is mostly covered by plaster. The plastered area extends to approximately elevation -050, above which the stone wedges of the seams can be seen. The wall extends to elevation +100. In front of the older wall is a later one built on top of a log framework at elevation +000-+020. Overlaying the framework is a mortared section of wall reaching up to elevation +050-+080. This is followed by stone masonry with stone wedges and stones in straight rows. The stone part extends to elevation +200 after which is a 150 cm-high undocumented area, on top of which is the brickwork tower part above present ground level (ca. +350) (Plates XXIII, XXIV).[2]

Unlike the south and east walls, the north wall of the tower did not reveal a distinct, later widened part. The north wall was built on a double log framework at elevation -250--180. At the time of documentation there was an external wooden structure in front of the lowest masonry section, which means that the stone wall is only known from elevation +000 upwards. At this location the lowest feature was thick mortar covering the stones. The wall with infilling stones starts at approximately elevation +100 continuing to elevation +300-+350, after which follows the brickwork upper part of the tower (Plates XXIII, XXIV).[3] In the west end, the north wall of the NE tower ends at a distinct structural seam, against which the north wall of the outer bailey was later built (Fig. 35).

The log framework foundation of the tower extends to beneath the log framework under the

[1] East and north wings 1975-1977; Kajala 1977-86.

[2] East and north wings 1975-1977; Kajala 1977-1986.

[3] East and north wings 1975-1977; Kajala 1977-1986.

wall; there is a difference in elevation of approximately one metre between the frameworks. Higher up, the stone wall of the tower forms a distinct corner structure extending to elevation +500. No corresponding joint can be observed in the brick part situated above it (Figs. 33 and 35 , Plates XXIV, XXV).[1]

The foundations of the original NE tower both outside and inside are approximately at elevations -250 - -200, above which the masonry wall begins at elevation ca. -200--150 a.s.l. The exceptional elevation of the masonry structures of the whole east part of the outer bailey is evident in the NE tower.[2]

During the Middle Ages water level was at least at +150-+250, which means that the NE tower was built either in water or that it had sunk as much as four or five metres after completion. Similar observations were made in the vicinity of the above-mentioned older SE tower, which was also several metres lower than assumed ground level at the time of construction.

3.6.2. The brickwork section of the northeast tower

Between the grey stone lower part of the NE tower and the upper part of brickwork is an undocumented area in the southeast and east walls, from which no structures are known. On the other hand, the structures of the north wall show that the stone-built wall extends to elevation +350 - +500, after which follows brickwork in Polish bond. In the SE wall, the brickwork does not start until elevation +800 and in the east wall at +350 - +400. The brickwork in all the walls contains intermediary courses of brick used to link the stonework and the brickwork. On the other hand, there were signs of timber niches associated with construction work. In the north wall between the tower and the north outer wall there are minor irregularities of brickwork among the various components, but no distinct joint can be observed in the brickwork.[3] It clearly appears that the brickwork of the north wall and the north outer wall of the NE tower dates from the same construction stage (Fig. 35, Plates XXIV, XXV).

A comparison of the bricks of the east wall and the NE tower (Fig. 32.) shows that the outer surfaces of these features were made (in Polish bond) of bricks that are almost identical in size. On the other hand, there are minor differences between the bricks on the inside and outside of the NE tower. These are caused by the exceptional size of the bricks of the room on the second floor of the tower (B 202). No detailed investigation of this room has been carried out, but stray observations suggest that the walls, partly within the room belong to the older four-cornered NE tower. The rooms of the upper stories are associated with the brick-faced NE tower that was repaired later (Plates III, IV, V).

A possible gateway

On the inside of the wall at the joint of the northeast tower and the east wall (room B 103) is a recess in the wall ca. 300 cm wide. The north part of this feature possibly had a doorway leading to the ground floor (B 102) of the northeast tower, for the present doorway leading to the room directly from outside (i.e. from the east) is clearly a secondary structure. (Plate II) It is impossible to establish in field work, whether the rear wall of the recess is original or a bricked-up opening — possibly one of the gateways leading to the outer bailey. Aki Pihlman has suggested this with reference to his own research[4].

Also the location of the recess on the outer face of the wall is poorly known, for the presently inclined south wall of the northeast tower mostly covers the possible location of an opening. On the otherhand, there are no observations of a structural joint or gateway jamb even in the south side of the possible gateway which should have come to light when repairs were made to the wall (Fig. 30, Plate XVII).[5] Therefore, we cannot be completely sure about the original function of the recess without detailed building-archaeological research.[6]

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[1] Drawings of the outer bailey walls.

[2] It is generally maintained that medieval construction was feasible only in locations above water level where the lime mortar could set.

[3] East and north wings 1974-1977; Measured drawings of the outer bailey.

[4] Pihlman 1994 A, p. 77.

[5] East and north wings 1974-77; Measured drawings of the outer bailey.

[6] The structures of the wall recess were not documented when the outer bailey was investigated in the 1970s and 1980s. In the 1990s, when the present research was conducted, the location contained facilities of the Turku Provincial Museum, which meant that the structure could not be investigated afterwards.

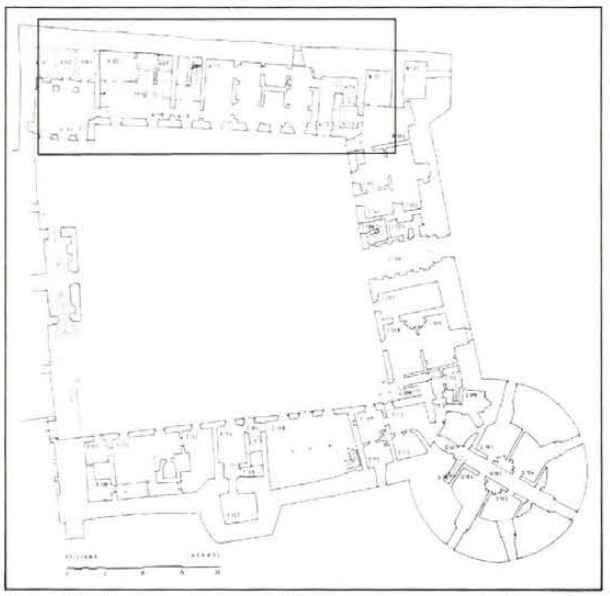

Fig. 34. The north wing of the eastern outer bailey of Turku Castle.

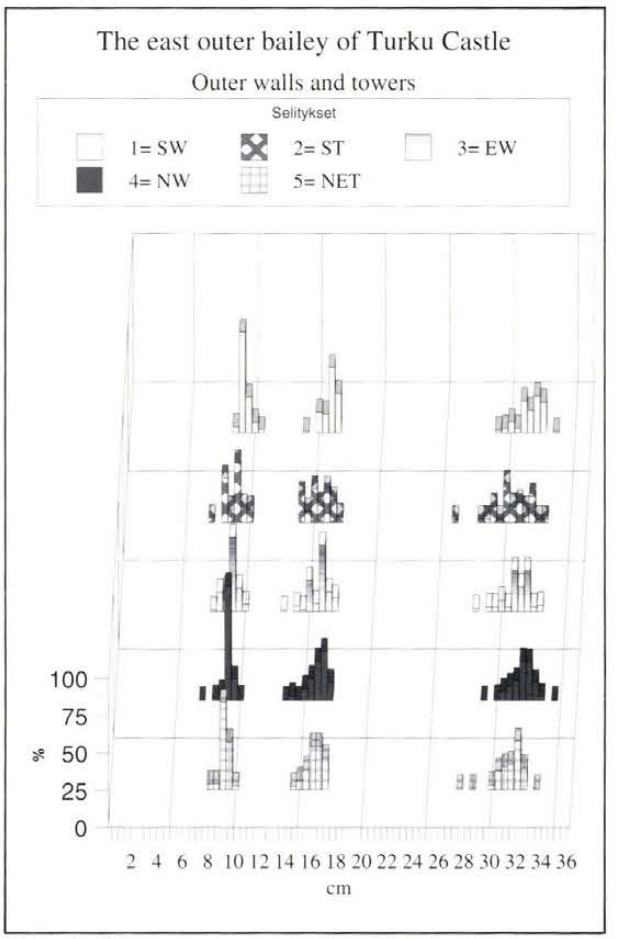

Fig. 35. The eastern outer bailey of Turku Castle. Brick size in the outer faces of the outer walls and towers of the outer bailey and the towers.
1 = SW south wall
2 = ST south tower
3 = EW east wall
4 = NW north wall
5 = NET northeast tower

3.7. The North Wall

The north wall is the longest uniform structure of the outer bailey (approx. 48.5 metres in length)(Fig. 33). It is bounded at the east end by the NE tower and at its west end it forms a right angle with the NW wall. At least in the west end, the lowermost structure of the wall consists of a single-course log framework at elevation -130 - -100. Overlaying this is in the west end is a 50-70 cm-deep stone setting mixed with clayey soil. On top of the stone setting is a double log framework. No lower log structures or stone fill have been found at the east end of the wall, but it should be noted that during the investigations, but it is possible that the layers beneath the actual log framework were not excavated during the field work.

In the west part the upper log framework is at elevation +0.30 - +0.70, in the middle section it is at -0.50 - +0.00 and in the east section next to the NE tower it is at -1.20 - -0.80. In other words, the framework sinks towards the east some 150 cm (or approximately 2 degrees) along the course of the wall (Plates XXV, XXVI, XXVII).[1]

The double foundation of the north wall is an exceptional structural solution, which suggests in any case that there were difficulties with the foundation already during construction. The lower log framework and the overlaying stone setting can also be interpreted as a structure which was older than the wall and was torn down to make room for a new foundation. Another alternative, which I feel is worth considering is that the soil conditions of the foundation were recognized during construction and a double foundation structure was built. The suggestion that the lower part had sunk immediately during construction and that a new wall had to be built higher up does not seem plausible. We can note that all the log frameworks and stone walls built upon them are inclined at the same angle and most probably sank into the soil when the walls were completed.

Like the log framework, the overlaying stone wall is also slightly inclined towards the east. In the west section, the stone-built part is approximately 570 cm

[1] East and north wings 1974-1977; Measured drawings of the outer bailey.

Fig. 36. East outer bailey of Turku Castle. There is a distinct structural joint between the northeast tower (left) and the north wall (right), showing that the north wall was built to adjoin the older tower.
(Archives of the Department of Monuments and Sites. Turku Castle).

high (330 cm above ground level), 550 cm in the middle part (230 cm above ground) and 580 cm in the east part (200 cm above ground). The stones vary in size and are laid in rows. As in the other walls, thelower part of the north wall includes a mortared section which is at elevation +200 in the west part, +180 - +200 in the middle, and +050 in the east part. In the section overlaying the mortared part the wedging stones of the wall are clearly visible and the wall is partly weathered. The elevation of the whole stone-built section is +660 in the west part, +550 in the middle section, and +520 in the west part, which means that the whole wall had sunk together with the log framework (Plates XXVI, XXVII).[1]

Overlaying the stone-built section is a section of brickwork in Polish bond, whose east part was clearly levelled prior to the construction of the brickwork overlaying the whole wall. In other words, the brick wall was built on top of the already sunken stone-built part. The brickwork contains indications of building layers, but there are no niches for timbers. The bricks vary in size between 7-10.5 x 13-16 x 29-34 cm, most of them measuring 9 x 15-16 x 32-33 cm (Fig. 35). The brickwork part extends to elevation +13.20 in the west section and +1270 in the middle and east parts. The height of the brickwork part is approximately 680 cm in the west ends and roughly 750 cm in the east end.[2] Like the other brickwork walls, the north wall also reveals distinctly that the eastern outer bailey had sunk prior to the building of the brick section. The bricks of the north wall are highly uniform. The north wall is clearly associated with the same construction stage as the other brickwork components in Polish bond in the outer bailey (Plate XXVI).

[1] East and north wings 1974-1977; Measured drawings of the outer bailey.

[2] Measured drawings of the outer bailey.

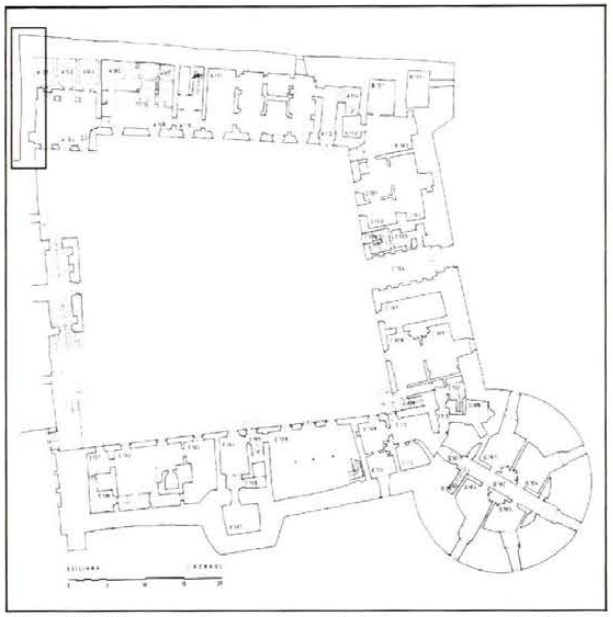

Fig. 37. The northwest wall of the east outer bailey of Turku Castle.

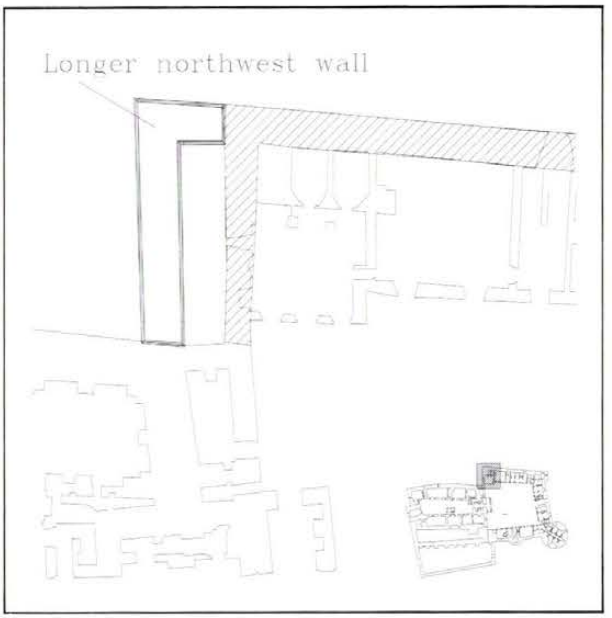

Fig 38. With reference to his own studies on the main part of Turku Castle, Knut Drake suggests that the north wall of the outer bailey originally extended further west and that the original NW wall was later replaced by the present wall.

3.8. The Northwest Wall

The northwest wall of the outer bailey connects the north part of the latter to the east end of the main part of the castle which was enlarged in the Middle Ages (Fig. 37). The stone built south part of the NW wall was built on bedrock at elevation +300-+400. In the north part, the wall was built on clay with a double log framework lowermost. The framework is inclined towards the north by some 10-15 degrees and is situated at elevation +120-+190.[1] The excavations show the log framework underlying the north and NW walls to be a uniform work with no indications of earlier stages of construction (Plate XXVIII).

Overlaying the log framework is a stone-built wall inclined towards the north with the rows of stones originally laid in a relatively straight configuration. In the stone-built part right at the foot of the bedrock is a small brickwork opening (50 x 80 cm), covered by a double layer of headers. The base of the opening is at elevation ca. +350. Moreover, the wall includes a secondary gateway built in the 16th century. The NW wall is about 180-200 cm thick, while the SW wall, interpreted as an intermediary wall, was originally only 140-150 cm thick.[2] In comparison, the surviving east wall is ca. 250-280 cm thick and the north wall is 220-250 cm thick. The NW wall is thus narrower than the other outer walls, but I would claim that this is not evidence of its use as only some kind of inner wall (Plate XXVIII).

The NW wall is the only part of the outer bailey where the grey stone masonry does not extend to approximately the same elevation on the inside and the outside parts. Here, the stone wall of the interior is roughly two metres lower.[3] This may be only a situation resulting from later repairs, or then a distinct ledge was built for some reason on the inside of the NW wall.

Northwest wall and the main castle

No building-archaeological investigations have been conducted at the joint of the northeast corner of the main castle and the northwest wall of the outer bailey, but the visible structures suggest that the northwest wall of the eastern outer bailey was built to adjoin the main part of the castle. Accordingly the construction of the outer bailey would provide a chronological boundary for the present east section of the main part of the castle.

Here it can be noted that the northwest part of the outer bailey can be dated to the early 1400s. [4] As a solution to the datingproblem of the east part of the main castle (Fig. 47), which has been recently dated

[1] East and north wings 1974-1977; Measured drawings of the outer bailey.

[2] East and north wings 1974-1977; Measured drawings of the outer bailey.

[3] Kajala 1977-1986.

[4] The age of the outer bailey is discussed in more detail in chapters 5.1-5.6

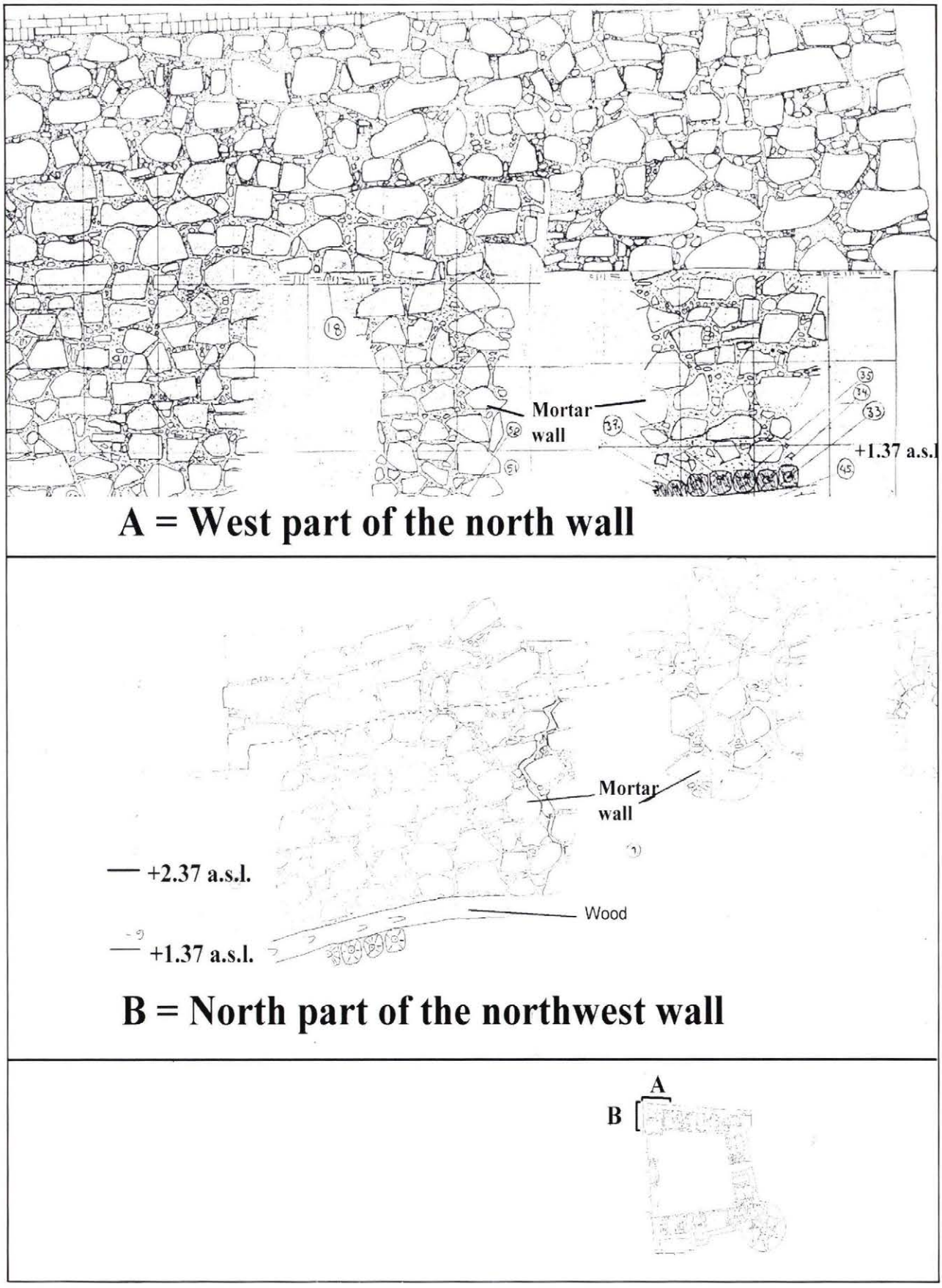

Fig 39. The northwest corner of the east outer bailey. Fig 39 A is lower part of the west part of the north wall (detail of plate XXVII). Fig 39B is lower part of the northwest wall. (Archives of the Dept. of Monuments and Sites, NBA. Turku Castle.)

to the late 15th century,[1] Knut Drake and Christian Lovén have suggested both verbally and in written communication that the northwest wall of the eastern outer bailey would originally have been located a few metres further to the west, whereby the northwest section of the outer bailey would originally have been connected with the east end of the main section and that it would have been moved later to its present state (Fig. 38).[2] It is difficult to find any definite building-archaeological evidence in support of this view. First of all, the above-surface and excavated parts of the joint of the north and northwest walls at the northwest corner of the outer bailey are clearly uniform in appearance (Fig. 39).

Lowermost in both walls are multi-layered log frameworks at almost the same elevation. These are overlaid by masonry of unworked stones evenly depressed towards the east. The courses of stones are in relatively even layers and there is no distinct variation in the size of the stones that would point to two different stages of construction (Fig. 39, Plate XXVII). There is some kind of joint in the upper part above the surface, but it is probably a later joint resulting from construction or movement.

Two dendrochronological samples (FIT 1615 and 1632) of the log framework foundation of the north wall have been dated (to early 1400s).[3] Of these, at least FIT 1632 was from the westernmost excavated pit of the north wall, i.e. immediately next to the northwest corner of the outer bailey (Fig. 39A). If the north wall had a structural joint approximately two metres from the northwest corner, the dated samples would be associated with the repaired northwest wall and not with the old and dismantled section of wall.

Neither does the suggestion of an older, subsequently demolished, north wall find support in the features to the west of the northwest corner of the outer bailey. No indications of walls have been discovered in this area during decades of investigations. Nor were such found during repairs to the outer bailey in the 1970s, in which connection an approximately 2-3 metre-wide area was excavated on the west side of the northwest wall of the outer bailey to at least elevation +1.00 and probably to lower levels.[4] It can of course be suggested that the above-ground parts of an older northwest wall had been torn down, but hardly the foundations and log framework would have been completely destroyed.

In the north curtain wall of the main part of the castle there is a stone slightly protruding from the wall at the site of the old east end. This feature could be interpreted as a binding stone. The wall structure has never been investigated, and there is no definite information on the original position of the stone or its links with the rest of the wall. In summary, it can be noted that the currently available archaelogical material does not permit the suggestion that the north wall would have originally continued a few metres further to the west and so on allso the east part of main castle should dated at least to early 1400s, probably to late 14th century.

3.9. The History of Construction of the Eastern Outer Bailey

3.9.1. The oldest parts of the outer bailey

The construction of the outer bailey was most probably begun in the shore area next to the Aurajoki River. The cultural layers under the walls point to long-term activity in this area before the construction of the outer bailey of masonry. Observations of building timbers were made under the walls, but at least in the light of present knowledge they cannot be linked to any log-built fortifications. The few timbers and the thick soil layers can mainly be associated with the use of the area as the riverbank zone of the castle.

The first construction stage definitely includes the narrow SW wall, the thicker south wall and the square south tower. East of the south tower, the wall most probably extended to the SE tower. The connection of south and east walls has not been found in the area of the SE tower, but construction continued in a uniform manner to the SE tower and from there to the east wall. Contrary to Rinne's assumption,[5] no remains of an early gate tower been found; the wall being of uniform construction since the beginning. The first construction stage ended at the SE tower, built at the SE corner of the outer bailey. Parts of this structure still survive beneath

[1] Drake 1993a, pp. 28-35, Drake 1994a, pp. 52-55; Lovén 1996 pp. 91-92.

[2] Discussions with Knut Drake in June 1996 and August 1998; letter from Christian Lovén to Kari Uotila, April 1998.

[3] More details about dendrochronological samples in chapter 5.1.

[4] East and north wings 1974-1977; Kajala 1977-1986; Measured drawings of the outer bailey.

[5] Rinne 1938, pp. 323-328. Rinne's suggestion of an older gate tower was already viewed critically in earlier studies. E.g. Gardberg 1959, p. 73.

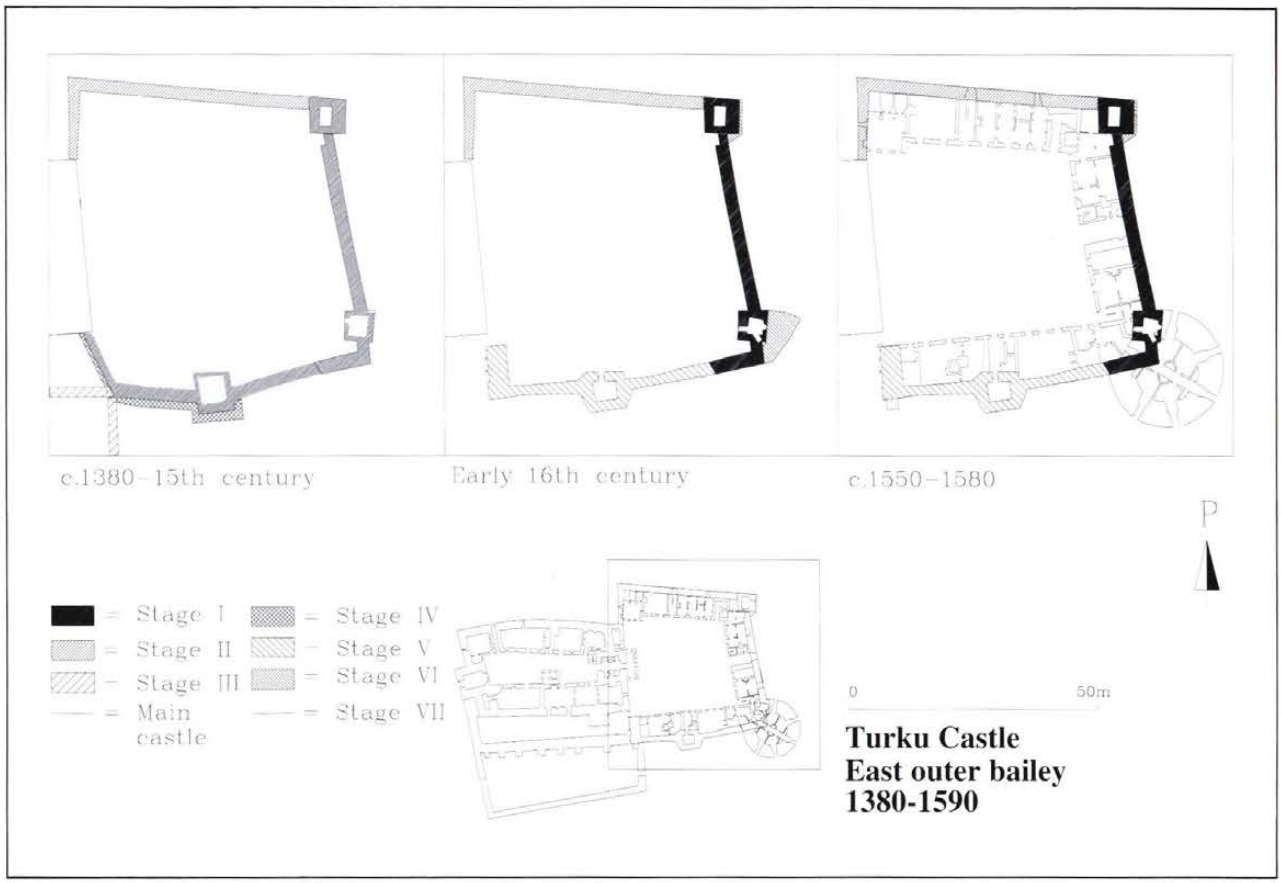

Fig. 40. History of construction of the east bailey of Turku Castle
In the first stage, the south and east walls with three four-sided flanking towers were built. This plan probably included the construction of the north and northeast wall, but for some reason the works were interrupted. In the second stage, repairs to the badly sunken outer bailey were attempted by building at first support structure, at least in the south wing, and then by renewing the whole wall. Repairs were also carried out in the southeast and northeast towers. In the third stage, a brick extension was built on top of the old walls of unworked stone and the towers. This component was of large bricks in Polish bond. Three-storey buildings were later built within the higher walls. (Illustration by K. Uotila)

the structures of the present SE tower. Of the gateways of the oldest outer bailey, the available archaeological data reveals only a brick lined opening located beneath the present round tower. [1]

The construction of the outer bailey came to an end when the NE tower was completed. It is possible that the soil and foundation conditions in the north wall were even worse than in the other parts of the outer bailey, or some other factor halted the work.

After some time, building work continued in a second stage along the north wall of the outer bailey, extending as a uniform structure to form the NW wall. There need not be any major chronological difference between the first and second stages of construction, since, for obvious reasons, the outer bailey could not have achieved a defendable shape until the north section was completed. Therefore, the joint of the NE tower and the north wall may only join two different parts of the same building stage.

After the first building stage, the outer bailey had three towers facing the river and a possible route from the town of Turku. The minor importance of the northern aspect in the defence of the castle is indicated by the fact that there is no tower of any kind in the north wing or NW corner of the outer bailey. Already in the first building stage, the outer bailey grew to its later area of approximately 3,000 square metres. Of the wall and tower structures it is known that most of them were of undressed stone, but for example the interiors of the towers included brickwork components. The surviving parts indicate that the walls were 6-8 metres high; 1-1.5 metres were originally under ground level as a foundation. There was no doubt a roofed wooden defensive structure on top of the wall, but there is no evidence of such. There are no surviving observations of the height of the tower, but if the later building tradition is taken as a guideline the towers were some three metres (one storey) higher than the walls (Fig. 40).

[1] On the gates of the outer bailey cf. Gardberg 1959, p. 150.

The settling of the oldest outer bailey

During the construction stage log frameworks were carefully built beneath the walls of the eastern outer bailey, and stone fill was even added between two log frameworks under the north section. These precautions, however, were insufficient; the structures of the whole eastern outer bailey sank and became inclined in an exceptionally marked way. This was no isolated event; the walls of the south part leaned by some 17 degrees towards the south (i.e. the river), which prevented their use. Moreover, the north part inclined towards the east by some two metres. After this settling into the ground, the defensive use of the outer bailey was possible difficult at least in several places, if not throughout the whole structure.[1]

3.9.2. The second construction stage of the outer bailey

According to historical sources, an outer wall of the castle collapsed in 1505,[2] and were repaired by 1507.[3] C.J. Gardberg linked these events with the construction of the south part of the outer bailey.[4] It is possible that the leaning west section of the wall and the south tower were first faced with a perpendicular supporting component and that in 1507 a new and more level south part of the outer bailey began to be built on top of the new supporting component and the old demolished wall. No separate supporting part was needed in the east section of the wall; the new wall was made perpendicular along the east-west axis and built with the old wall as its foundation. In addition to the completely renovated south part, repairs could also have been made in the SE tower, although there is no distinct evidence of medieval repairs. All major alterations to the towers are of later date.[5]

The stone wall was raised slightly in the east part and it is possible that also a wider extension was built onto the NE tower, which would point to the raising of also this tower. The grey stone wall of the north and northwest wings was left in its now leaning position, which also points to the minor importance of this direction for the defence of the castle (Fig. 40).

[1] On the problems of the settled structures, see e.g. Paatonen 1994, pp. 55-57.
[2] FMU VI, nro. 5110.
[3] FMU VI, nro. 5244.
[4] Gardberg 1959, pp. 46-47 and pp. 72-73.
[5] Cf. Gardberg 1959, pp. 72-73.

3.9.3. The third construction stage

The third more extensive construction stage of the outer bailey dates to as early as the middle of the 16th century, and is discussed at length in Gardberg's study. According to Gardberg, a new tower gate was built in the middle of the east section in the middle of the 16th century and a few years later (in 1567) the medieval stone walls were raised with a brick section 6-7 metres high.[6] Historical sources show that these works were apparently carried out in a few years, which is also suggested by building archaeological data, such as the use of highly uniform brick material throughout the whole building stage.[7]

In addition to the walls, all the old towers were raised or renovated in this connection. The top storey of the south tower was clearly built within a single stage. Furthermore, comparisons of brick size make it highly probable for the later brick structures of the SE tower in the passageway and upper staircase of room D 108 to be associated with the same construction stage as the raising of the walls. The raising of the tower may have required the widening of the foundation, which would have included the wide foundation section of the SE tower beneath the round tower. Also linked to this stage was the widening of the foundation of the NE tower and the raising of it to four-storey height. Accordingly, the polygonal shape of the SE and NE towers would date from around the middle of the 16th century and not from the Middle Ages (Fig. 40).

[6] Gardberg 1959, pp. 148-152 and pp. 303-316.
[7] In the spring of 1563 (February) the work of raising the outer bailey wall was begun. This work required 125,505 bricks and several master bricklayers. The work appears to have been completed during the summer of 1563 (Gardberg 1959, pp. 312-316; Nikula O. & Nikula S. 1987, p. 435; cf. Snellman 1891, p. 18.).
The outer bailey wall was first raised by adding a 6-7-metre high and two-metre-wide brick section, which was approximately 180 metres long (the total volume was approximately 2,100 - 2,500 cubic metres). Moreover, the work included the raising of three towers. Even though the work began in February (which is very early in the year for bricklaying), the brickwork was an immense task for one summer season. The building work, however, did not last all summer. Around the 20th of July, the troops of King Erik laid siege to the castle, which surrendered on the 12th of August (E.g. Gardberg 1993a, pp. 40-41; Nikula O. & Nikula S. 1987 p. 47).

3.9.4. The fourth construction stage

The largest building works of the eastern outer bailey came under way in the 1570s, when the new rondell tower was built to replace the old SE tower. In the 1580s the building work moved to the courtyard area within the outer bailey walls, where dwellings and auxiliary buildings of masonry came under construction for the first time. A three-storey "new castle" was built in the outer bailey, and it would gradually become the economic and administrative hub of the whole castle.[1]

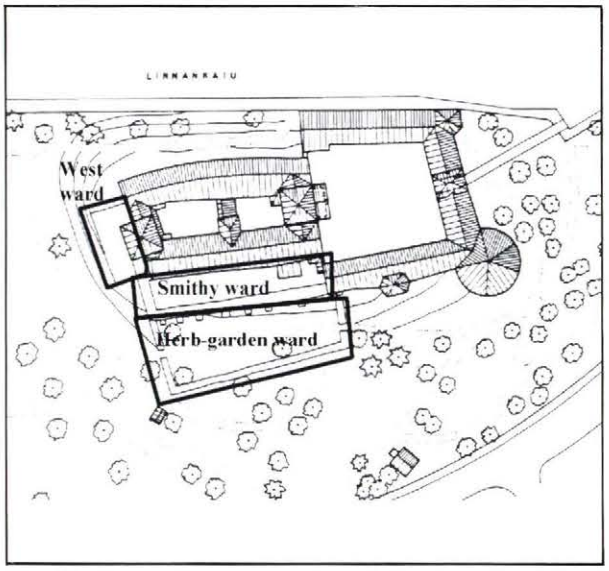

Fig 41. The south outer wards and the west outer ward of Turku Castle.

4. THE SMALLER WARDS OF TURKU CASTLE

4.1. The South Wards

History of research

Located south of the main part of Turku Castle are two outer wards, or baileys, of which the upper one is the so-called "smithy yard or ward" and the lower one is known as the "herb-garden ward". (Fig. 3, 4, and 41, Plate XXIX) There has been very little field work in the south wards. Investigations directed by Juhani and Sigrid Rinne were carried out in the early years of the 20th century, but only a few maps and plans of this field work survive. Archaeological excavations were carried out in the smithy ward in the 1950s, but they did not extend down to the natural layers, and there were few observations of various wall structures.[2]

4.1.1. The smithy ward

The south walls of the smithy ward and the eastern outer bailey appear to form a uniform outer bailey structure to the south and southeast of the main part of the castle. The upper south ward is situated some 15 metres south of the main part and the incomplete archaeological data suggest that the surface of the ward or yard area sloped steeply, which means that the ward or bailey was a defensive structure of the *Zwinger* type. There are only isolated observations of the struc-tures of the south wall of the smithy ward. The investigations of the early years of the 20th century suggest that the original wall was built of stone and brick with rows of bricks passing through it at intervals of approximately two metres.[3] There are also stray indications that the wall was widened at some stage.

In the 1970s it was noted that the south wall of smithy ward extends to beneath the east corner of the present outer bailey.[4] On the other hand, there is no data on a connection between the oldest wall of the eastern outer bailey and the south wall. An indirect indication, however, is found in the fact that the SW and south walls of the eastern outer bailey are of a single structure as shown by the log frameworks and the bond of the stonework. It can thus be assumed that the wall of the south ward was built adjacent to these structures at a later stage.

At present the walls of the outer ward are roughly two metres high. As early as the beginning of the 19th century they reached the same height as the brick walls of the adjacent eastern outer bailey, i.e. -13.00 - +14.00 a.s.l. The wall foundations were possibly at ca, +300 - +400 a.s.l. In other words, the

[1] Gardberg 1959, pp. 427-439 and pp. 452-487.

[2] The diffuse excavation material pertaining to the smithy war (known as the "prisoners' ward" in the maps and plans of the 1950s) is kept in the archives of the Dept. of Monuments and Sites, NBA. Turku Castle.

[3] Rinne 1900-1930.
Zones of brick were similarly used in the walls of outer bailey I of Kuusisto Castle, where the binding structures of brick are linked to the wall which is faced with brick. (See Chapter 6.5.5.)

[4] Soiri & Merikanto 1974.

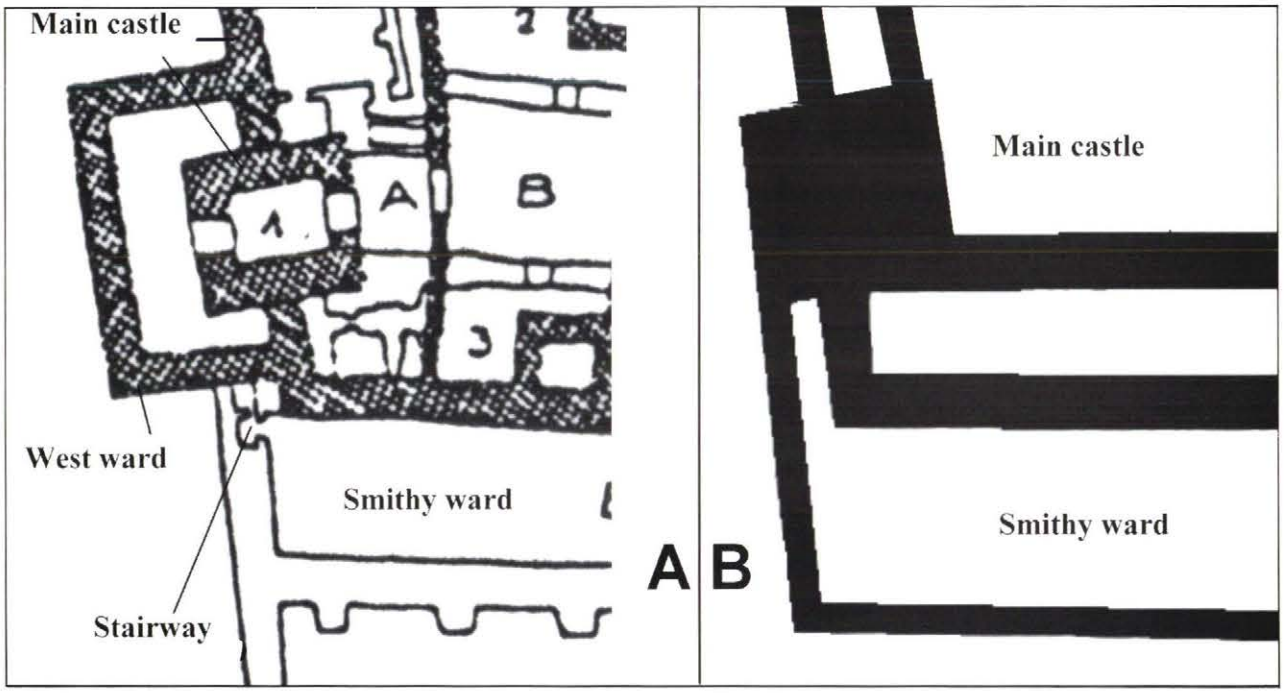

Fig. 42. The connection of the south ward of Turku Castle with the west end of the main castle.
On the left (A) is a partial enlargement of Juhani Rinne's plan of Turku Castle during the Middle Ages (the plan as a whole is in Fig. 5). According to Rinne, the wall of the upper south ward (smithy ward) joined the west ward at the north section, but was not directly joined to the main castle. Rinne also claimed that in the northwest corner of the smithy ward was a small building component – possibly a staircase. On the right (B) is a partial enlargement of Iikka Kronqvist's reconstruction of Turku Castle in the Middle Ages (the whole plan is in Fig. 6). The west wall of the south ward is directly joined to the west tower. Kronqvist claims that a narrow space remained between the main castle and the outer ward. (Illustrations Rinne 1938, p. 324 and Kronqvist 1947, p. 58; revised by K. Uotila)

south wall was at least about ten metres high.

The oldest maps and drawings show that there were seven supporting pillars in the outer surface of the south wall,[1] which still survive. Of the actual wall structures, the maps, plans and paintings suggest that the uppermost structure was a roofed defensive platform with ten or so loopholes (Fig. 43, 44).[2]

The 18th-century maps show that there was a building with a peaked roof at the west end of the outer ward.[3] It is possible that the foundation structures of this building were revealed in the excavations of the 1950s.[4] In the late 1950s, the remains of a large building of stone were excavated in the south end of the outer ward. At the time, the outer walls were interpreted as parts of an older building.[5] With reference to the artefact finds, Pihlman dates the building to as late as the 18th century. On the basis of the limited observations of the walls, the date suggested by Pihlman appears to be reliable. The outer ward contains the remains of a few indistinct buildings, but owing to the lack of archaeological data it is almost impossible to suggest any interpretation.[6]

In the east part of the outer ward is a large structure of unworked stone and brick, which has been interpreted as a supporting buttress. According to investigation data, the stone-built lower part of large structure (7.5 x 4.5 metres) is closed. The excavations of the 1950s showed the eastern exterior wall of the supporting structure to extend within the exterior wall and to be an older structure than the latter.[7] This also suggests that the lower parts of the structure are clearly of medieval date.[8]

[1] For instance, six supporting structures are marked in a map from 1732 (KrA. Åbo nr 7) and seven in 1767 (KrA. Åbo nr. 14).
[2] On the 18th-century pictures, see e.g. Gardberg 1959, pp. 16, 18 and 24. The state of the south wall is shown in Thomas Legren's oil painting of the 1830s entitled "Turku Castle". TMM 4070.
[3] KrA. Åbo nr 4 (year 1734), nr 5 (1732), nr 6 (1732), nr 7 (1732)
[4] Smithy ward 1957.
[5] Smithy ward 1957; Gardberg 1959, p. 50.
[6] Pihlman A. 1995, p. 155.
[7] Smithy ward 1957.
[8] E.g. Gardberg 1959, p. 29, Fig. 10.

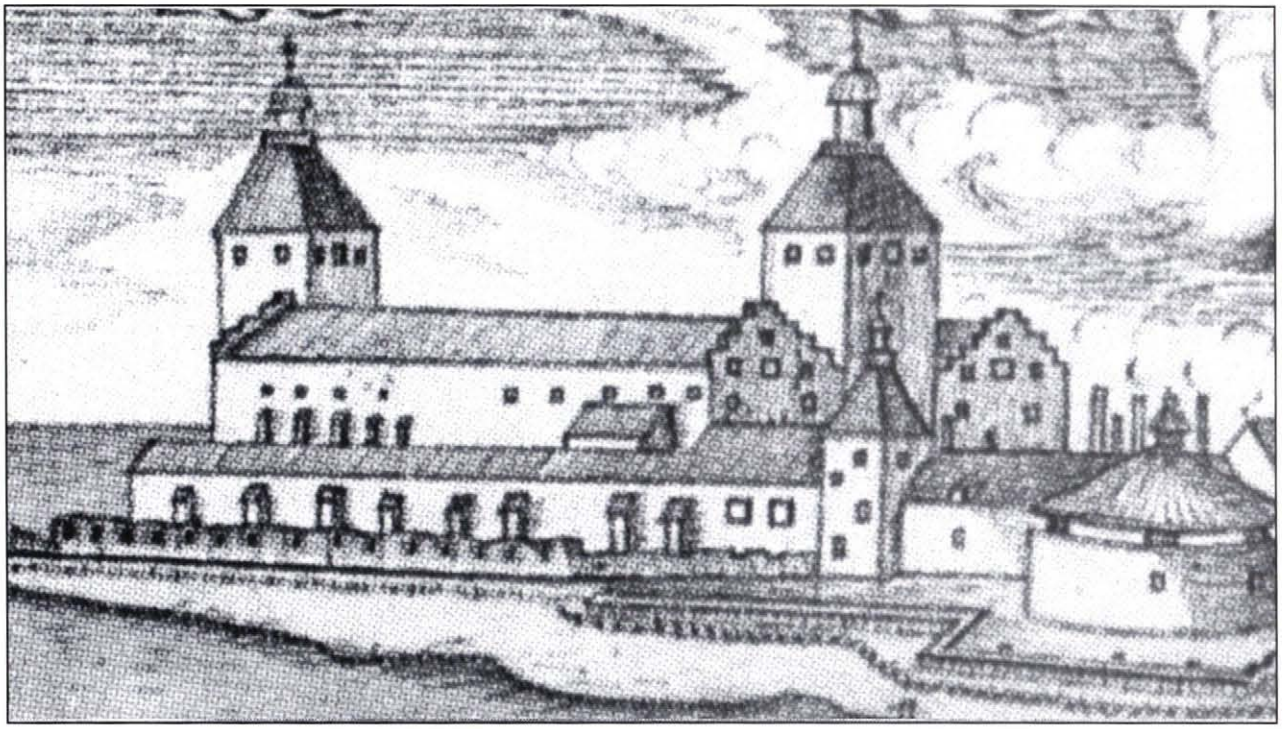

Fig. 43. Turku Castle in the 18th century, southeast view.
In the picture (from 1724), the walls of the south ward (smithy ward) are intact and reach the same height as the rest of the outer bailey. The firing gallery of the walls is roofed and the wall has a total of eight supporting pilasters. (Detail enlarged from KrA, Hydrografiska kartor. Litt XIV:20. Pencil drawing, signed CH, Nils Strömcrona's navigational chart for Turku, 1724; see Kokkonen 1995, p. 191 fig. 85 and Gardberg 1959, p. 16, fig. 2)

The connections of the walls of the outer baileys with the main part pose a difficult problem. This has already been discussed in connection with the eastern outer bailey (especially the SW corner). The same situation applies in the connection of the smithy ward with the main part of the castle. The west wall of the smithy ward appear to continue as far as the west tower, leaving a narrow passageway or intermediary space between the outer bailey and the main part. The passageway was already sketched by Kronqvist in the plan of the castle.[1] If such an intermediary space had existed at the connection of the smithy ward and the west tower we can assume that a similar structure was also used at the connection of the eastern outer bailey and the east tower.

According to a plan of the castle presented by Rinne in 1938, the west wall of the smithy ward was structurally joined to the wall of the western outer ward and there was a structure that could be interpreted as some kind of staircase in the NW corner of the smithy ward.[2] This sketch-like plan is the only reference to a possible gateway in the smithy yard. Rinne may have relied on his own observations, but no drawings related to investigations have been stored in the archives.

4.1.2. The herb-garden ward

The lower southern outer ward, also known as the herb ward (Fi *yrttipiha*), extends to approximately 40 metres from the main part of the castle (Fig. 41, Plate XXIX). The most prominent part of the ward - the east wall has a built-in joint [3] with the oldest wall structure of the eastern outer bailey[4], which means that also the lower southern outer ward would have been built before the repairs of the eastern outer bailey, which are dated to the years 1505-07. On the other hand, the walls of the herb garden ward would thus have been very close to the water line, and most probably part of the time in water. It can thus be suggested that there were several walls of different

[1] Kronqvist 1947, p. 58.
[2] Rinne 1938, p. 324.

[3] This joint is one in which a second wall (the herb-garden ward wall) was built against the older wall structure (the oldest south wall).
[4] Soiri & Merikanto 1974.

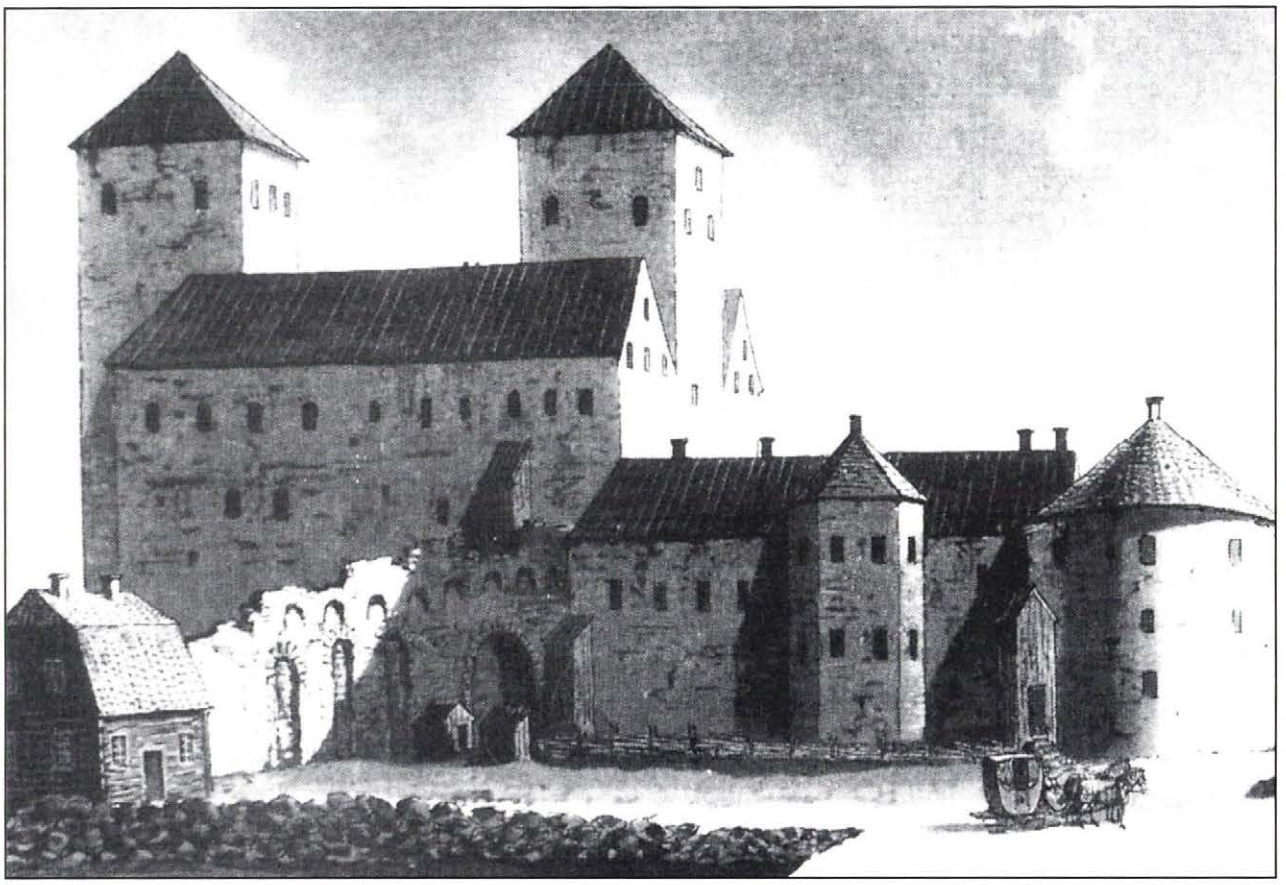

Fig 44. In the picture (from 1799), the south ward is in poor repair as also the tops of the walls, but they nevertheless extend to the same height as the walls of the east outer bailey. There are still signs of some kind of crenellation in the upper part of the walls and there is a large gateway in the west part that was not yet there in the early 18th century. (detail enlarged from a painting by Skjöldebrand 1799, engraving by M. R. Heland 1801-02. Helsinki University Library. See Knapas & Koistinen 1993, p. 73).

age in the area of this ward. These are still unknown, for the whole outer ward remains to be investigated.

According to sections in early 18th-century maps, the lower part of the wall was of natural stone at the time and the upper part was most probably of brick. At present, the south wall is roughly 210-250 cm thick, and the old maps point to a height of some six metres, of which the grey stone section was approximately three metres. There was a high protective palisade in front of the wall.[1]

It is possible that the older - medieval - encircling wall was later topped with a lean-to roofed brick wall with embrasures for cannon.

The difficult humidity conditions of the herb-garden ward are also indicated by the fact that in the 1570s a large artillery tower similar to the round tower was planned for this location, but the foundation work proved to be too difficult and the whole project was given up.[2]

4.1.3 Summary

There are many construction stages and details yet to be established in the walls of the south wards of Turku Castle. In the meantime, we must limit ourselves to a few general observations. The available material suggests that both of the south wards were built adjacent to the walls of the oldest stage of the eastern outer bailey. The narrow shape of the SW wall of the eastern outer bailey suggests that it was originally planned to be only a connecting wall between the main part and the outer bailey - and not an outer wall as such. The first building stage would thus have included some kind of fortification south of the main part, which would have been the outer wall of the smithy ward. It can be noted that the herb-garden ward was built adjacent to the oldest south wall of the east section.

[1] KrA. Åbo nr. 4 (/1734/), nr 6 (1732). The wall of the herb garden and its loopholes can also be seen in a map illustration from 1724 (KrA. Hydrografiska kartor. Litt XIV:20; see Gardberg 1959, p. 16; Kokkonen 1995, p. 191, fig. 85).

[2] Gardberg 1959, pp. 435-436.

4.2. The Western Outer Ward

Basing on his investigations of the early years of the 20th century, Juhani Rinne suggested that already in the oldest stage of the castle there had been a small rectangular fortification of stone in front of the west tower, i.e. the western outer ward or bailey (Fig. 5 and 42).[1] The walls of this ward or bailey have only been excavated during Rinne's period in the early 20th century, and accordingly the observations have been questioned or completely bypassed.[2]

With reference to the history of other castles in Finland, it was no exceptional idea to protect the area in front of the large west gate of the main part of the castle with a wall. On the contrary a large gateway actually required a fortification of this kind to shield it. In addition to Rinne's observations and conclusions there are no other indications of a western outer ward or bailey, and this point must remain the subject of later studies, if there are still any remaining structures on the bedrock mound of the site. The waterline was coming very close to the main castle and specially west tower even in 18th century (Fig. 8) and it is possible, that there was no space for a ward in the west part in the Early Middle Ages.

[1] Maps and plans of Turku Castle dating from 1732 show some kind of wall structure also on the NW side of the main castle. (Fig 8) his structure extended to the west tower of the main part, to which it was joined. It can be suggested that if such a fortification had been built in the 1730s, the walls noted by Rinne could be associated with it. KrA. Åbo nr 5 (1732), br 6 (1732), nr 7 (1732).

[2] Rinne 1914, p. 263 and 1938, pp. 323-328. Cf. Gardberg 1959 p. 51.

5. THE DATING OF THE OUTER BAILEY STRUCTURES OF TURKU CASTLE

In the present study dates for the outer bailey structures of Turku Castle have been sought through natural scientific (dendrochronological and radio-carbon), archaeological, building-archaeological and historical methods.

5.1. Dendrochronology and Turku Castle

The dendrochronological dating method became widespread in Finland and the rest of the Nordic countries in the 1980s.[3] At this time a laboratory of dendrochronology was founded in Joensuu, Finland. The laboratory has been headed for many years by Pentti Zetterberg. Over the years, the Joensuu laboratory has become the only facility of its kind in the country, although there were plans in the 1980s to establish a separate laboratory in southern Finland.

Dendrochronology at Turku Castle already came under way in the 1970s and '80s, when a large number of timber samples were collected from various parts of the outer bailey and from excavated locations in the ward area (Figs. 45 and 46). Over time, some of the samples have become unrecognizable and unusable, as data on the finds has been lost, the material has decayed, or for other reasons. It can be stated that in the Turku Castle research project at least most of the timber material suitable for study has been analysed. New dendrochronological data can only be obtained by excavating the parts located under the outer bailey.

In the Turku Castle project, the wooden material was analysed in two stages: first by the National Board of Antiquities in 1991 and later within the project itself in 1993.[4] On the first occasion, the criterion of selection was mainly the condition of the material, i.e. the samples appear to have been primarily selected from a dendro-chronological standpoint, although other research considerations were also present. There were many confusions in the collection of material; the samples include

[3] Dendrochronological dates have been the subject of discussion in all the Nordic countries. E.g. Engberg 1992 and Jensen 1992.

[4] Zetterberg 1991; Zetterberg, 1993a; Zetterberg 1994, pp. 39-48.

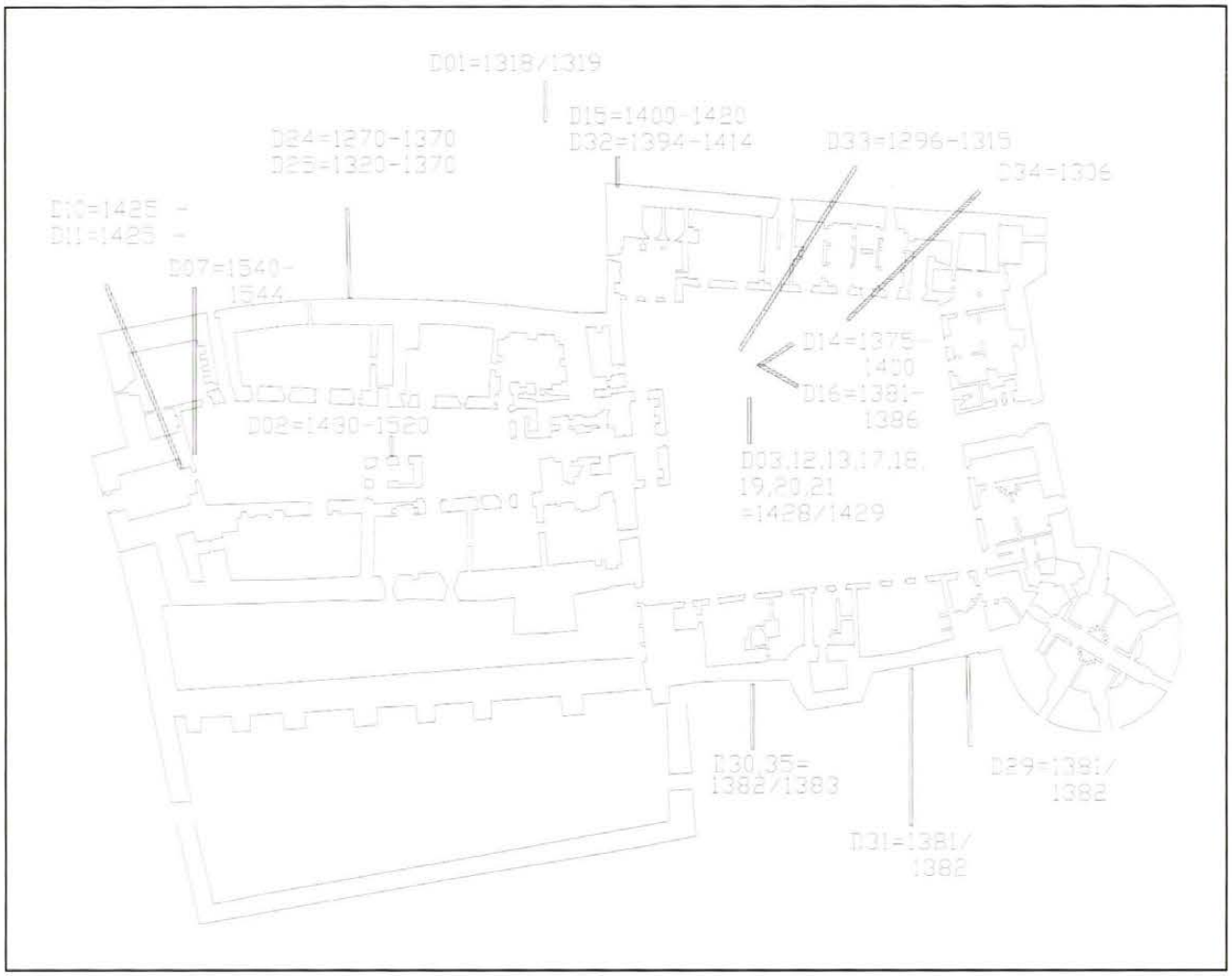

Fig 45. Plan of Turku Castle showing the location and dates of dendrochronological samples analysed in the 1990s (D=FIT). (Drawing by K.Uotila)

three logs (FIT 1604, FIT 1605 and FIT 1606) that were in no way associated with Turku Castle.

Moreover, the material included timber sample FIT 1616, whose actual finds data could not be established. All in all, 11 pine, 12 spruce and 5 oak samples (total 28) were analysed on the first occasion. This is a large number for Finnish conditions. On the second occasion, the finds data on the samples was investigated more thoroughly and samples were selected which had definitely recorded finds data and were suitable for dendrochronological dating. This process provided seven new pine samples, which means that during the 1990s a total of 35 timber samples were investigated. Of these 32 pertain to Turku Castle.[1]

5.1.1. The pine samples

The oldest pine sample is FIT 1633[2], from the uppermost course of logs in a log framework caisson excavated in the ward area of the eastern bailey. The surface of the timber is decayed and worn, but the sample contains year rings as far back as 1295, and the tree was felled at the earliest in the winter of 1296/97. The estimated time of felling is between 1296 and 1315.

The chronologically following sample, FIT 1601 is an upright timber of the palisade excavated on the north side of the main part of the castle. The tree was felled in the winter of 1318/1319 (here winter means the period from October to April).

The third dating is of two timbers in the north outer wall of the main part of the castle, which had a timber breastwork partly embedded in the wall. The series of year rings in sample FIT 1624 ends in

[1] Zetterberg 1991 and 1993a.

[2] In Fig 45. FIT 1633 = D33.

the year 1261, but there are several rings missing from this sample, and accordingly its estimated time of felling is 1270-1370. The rings of the other sample (FIT 1625) extend back to the year 1319, but here too rings are lacking and the estimated time of felling is between 1320 and 1370. Moreover, three oak samples (FIT 1626, FIT 1627, FIT 1628) were taken from this timber structure, but they have not yet been dated.

The next group consists of pieces of timber already excavated from beneath the south wall of the outer bailey in 1974. Of these, four were analysed. FIT 1629 and FIT 1631 are samples from the log framework foundation of the oldest south wall located between the south tower and the round tower. They are dated to the winter period 1381/82. Sample FIT 1630 and 1635 are from the log framework of the oldest south wall west of the south (hexagonal) tower and are date to the winter of 1382/83. It should be noted that in all four timbers the original sub-bark surface still survives. I would interpret this as indicating that the timbers were not exposed to the elements for any longer period but had been laid without much delay in the clayey soil of the wall foundation.

Excavations in the courtyard of the outer bailey produced two wood samples, of which FIT 1614 (a plank) is from the period 1375-1400 and FIT 1616, a length of timber of problematic provenance, is from 1381-1386. It was assumed in 1991 that FIT 1616 was from the log framework beneath the north wall, but it has later been ascertained that this is a piece of timber from the courtyard area.

The next group consists of two samples from the west end of the north wall of the outer bailey (FIT 1615 and FIT 1632). It is probable that the pieces are from the same trunk and that the series of year rings in FIT 1615 ends at 1395, the estimated time of felling falling between 1400 and 1420. The last year indicated by the ring is 1392 and the estimated time of felling is in the period 1394-1412. If these samples are two pieces of wood from the same tree, their joint date would fall between 1400 and 1412.[1]

One of the pine dates of the main part of the castle is from the outer wall of the southern staircase tower, which contains a piece of considerably worked timber. The year rings end at 1425, but rings had been removed and the time of felling may be long - possibly within a span of 5-100 years, but most probably in the late 15th century or the beginning of the 16th. The other younger sample

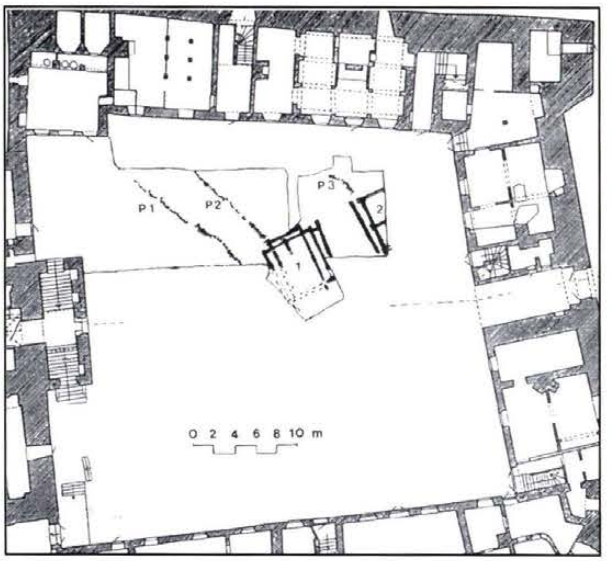

Fig 46. Timber structures in the ward area of the east outer bailey of Turku Castle. Several samples for dating were obtained from the rows of posts crossing the yard area (P1, P2 and P3). (Pihlman A. 1994, p. 74)

from the main part of the castle is from the outer wall of the west tower at the location of room 30. The rings of this sample end at 1539 and the probable time of felling was between 1540 and 1545.

Moreover, an uncertain date was obtained from the palisade of the courtyard area of the outer bailey. The post in question had only 48 surviving year rings, which is insufficient for a reliable date, but the timber contains features whereby it could be dated to 1306.

5.1.2. The spruce samples

The dating and related reporting of the spruce samples are the most problematic aspects of the dendrochronological material of Turku Castle. In dating report no. 87 from 1991 the spruce samples are treated in the same manner as pine without posing any problems as to their interpretation.[2] Apparently the approach or other aspects changed by 1993, when some of the already dated spruce samples were rejected, although not all.[3] The same line was followed in 1994, when P. Zetterberg, in a letter to Knut Drake, noted that the dates of the spruce samples are only tentative and may prove to be incorrect.[4]

[1] See also Zetterberg 1994, pp. 40-45.

[2] Zetterberg 1991.

[3] Zetterberg 1994, pp. 45-46.

[4] Pentti Zetterberg to Knut Drake 19 April 1994. D:no 94-99. (The dating results for spruce are truly tentative, and not definite, and may even prove to be incorrect.)

The problems of the spruce samples also emerged at two other castle site in 1992 and 1993. In the autumn of 1989 a total of 12 timber samples were taken of the palisade encircling Raasepori Castle. Four of these are of spruce and eight of pine. The samples were dated in 1992 with the result that all the pine samples were from the winter of 1426/27. The spruce samples were probably of the same age (31-57 year rings), but in 1992 no reference material for them was not available.[1] Also in the 1993 dating of posts from Kuusisto Castle no spruce samples were dated (57 year rings), because of the lack of material for comparison.[2]

The oldest spruce samples are from the rows of posts in the courtyard area of the outer bailed. Of these, seven posts were dated (47-75 year rings). All the dated timbers were felled in the winter of 1428/1429. In addition, a post under the heading "shore breastwork" is dated to the same year and is most probably associated with the same posts (Fig. 46).[3]

The other group of spruce samples (three boards) were from the joint of the vaulting and the wall in the vaulted cellar of the west tower. There were only a few year rings in the boards, but in the 1991 report the last year ring of samples FIT 1610 and FIT 1611 is given the date of 1450. It is possible that the boards are from the 1420s-30s, but at any rate from the 1450s at the latest. In a later article, Zetterberg notes of samples FIT 1610, 1611 and 1609 that owing to their short series of rings they can never be dated.[4]

5.1.3. Secondarily used timber in dating samples

The possibility of the reuse of timber is one of the main problems of dendrochronology.[5] This problem has usually been solved in excavation by trying to find as samples timber associated with structures and with no signs of having been carved or worked at an earlier stage — such as old joints or other grooves. This method also entails problems, because it is often difficult to interpret the origin of timber in an excavated location. The problems are compounded when areas and locations are studied that have been excavated much earlier, as in the outer bailey of Turku Castle.

One way of dealing with previously investigated areas is to review the degree of preservation of the analysed timbers. In such cases, the timbers of the log frameworks are excellent material, because we may assume that they were placed deep within the clayey soil immediately in the construction stage.

At Turku Castle a total of 13 timber samples can be dated to within a single winter period. All of these were discovered in clay (posts) or in log frameworks dug into the clayey soil. A less precise estimate of felling dates was obtained for 15 samples, two of which were from a log framework in the clay and 13 were from various structures that were above ground level at the time of construction.[6]

It appears that in medieval structures the sinking of timber originally into the clay protected the surface from decay and therefore all the year rings can still be found. On the other hand, the surface of building timber for structures originally above ground level decayed and was destroyed already while in use and their dating to within a single year ring is difficult.[7]

With reference to the above, I would suggest that the four timber samples from the south wall of the outer bailey of Turku Castle, dated to the winters of 1381/82 and 1382/83, were in primary use. Regarding the late -14th-century wooden breastwork, it has been suggested in theory that it was later (possibly in the late 15th century) replaced with stone walls and the old timbers were used for the foundation of the new south wall. According to Zetterberg, however, the wooden material was preserved as follows: "In all these timbers (FIT 1629, 1631, 1630 and 1635), the original sub-bark surface was preserved..."[8] If the log breastwork has stood for instance for a fifty or hundred years, it would be very difficult to believe that the wall timbers would have survived without decaying for the duration. Therefore, I interpret the timbers

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[1] Zetterberg 1992.

[2] Zetterberg 1993b.

[3] Zetterberg 1991; Zetterberg 1993a, and Zetterberg 1994, pp. 45-46.

[4] Zetterberg 1991 and Zetterberg 1994, pp. 45-46.

[5] A further problem is the stand drying of timber. In this situation the tree itself has been dead for a long time before being felled for use. The problem is heightened in radiocarbon dates of the timber, but in principle it can also provide unnecessarily old dates for dendrochronology. In my opinion, the possibility of stand-dried timber can be rejected if several samples of the same structure can be dated to the same period within the same year of felling.

[6] Similar material is available from Kuusisto Castle (Chapter 6.6.3.), where the age of seven posts sunk in the clay is known to within a single winter period and two posts had decayed to only a minor degree. Of the five foundation timbers of tower C, the surface layer survives in three and only a few year rings were damaged in two. The surface layer of the upright posts beneath the foundation of outer bailey II has survived (Zetterberg 1993b; Zetterberg 1996).

[7] Dendrochronological dates were obtained for thirteen wall timbers of the Hurula fishing hut Keimiönniemi in Muonio. The dating is by Pentti Zetterberg. Nine of the timbers could be dated to within a single winter period; three to within a few years and only one to a broader period (Korhonen 1994, pp.116-117).

[8] Zetterberg 1993a.

beneath the south wall as the original foundation of the stone-built wall.

5.1.4. Summary of the dendrochronological dating

The oldest timber samples from Turku Castle are from the log caissons in the outer bailey courtyard and the palisades encircling the castle. The samples, dated to the turn of the 13th and 14th centuries, may be of secondary use, but on the other hand, they may also point to actual construction. The following group of dated samples is from the structures of the north gate of the main part of the castle, which clearly appears to have been built in the 14th century-, perhaps around the middle of the century. The most important chronological samples for the eastern outer bailey are from the foundation of the oldest south wall, where four timbers provided dates to the winters of 1381/82 and 1382/83. Of the foundation structures of the outer bailey, there is also a date from the NW end, where two timbers were dated to the very beginning of the 15th century. In addition, the samples associated with a timber structure were obtained from the courtyard of the outer bailey. These are dated to the close of the 14th century, although there are doubts as to their primary use. Excluding the data on the spruce samples, we obtain a picture in which the main part of the castle was encircled with a palisade and a log caisson at the turn of the 13th and 14th centuries, the north gate of the main part was built in the 14th century, the south part of the outer bailey was built in the 1380s and the corresponding north part was built in the 1400s-1410s. In the late 14th century there was building activity in the outer bailey courtyard, as shown by two dated timbers. This overall picture is in agreement with the overlaying mortar layer in the outer bailey courtyard, which would thus be dated to the second half of the 14th century- i.e. the period when the outer wards were constructed.

The dating of the spruce posts to the late 1420s makes it necessary to regard all the pine timbers from the ward area as having been in secondary use. It also suggests that the multi-part shore and yard terrace was constructed some 30-50 years after the outer bailey walls were built. The suggestion that the ward was not terraced until several decades after the completion of the outer bailey does not seem probable. Moreover, the overlaying mortar on the terrace would have had some other function than a construction-related one.

On the basis of the above, I would more readily point to the unreliability of the spruce dates. Accordingly, the whole development of the outer bailey area and it courtyard dates from as early as the 14th century.

5. 2. The Radiocarbon Dating of Mortar

Dating methods based on the half-life of radioactive carbon have been known for long. The radiocarbon dating of mortar, applicable to building archaeology, is a method that has been developed over the past few years particularly in the Åland Islands, in studies of several churches, the convent of Kökar and Kastelholm Castle.[1] On the Finnish mainland this method was not applied until the 1990s, at least at Turku Castle, Kuusisto Castle and in the excavations of the Rettig Residence (the Aboa Vetus Museum) in the City of Turku.[2]

The method is based on the fact that partly unslaked lime mortar hardens in the wall and that this reaction time sets into motion the decay of radioactive carbon as oxygen is released from the mortar. In natural-scientific terms, the method is simple and has been known for long, but its applications in the humanities have raised problems.[3] One definite problem is how to distinguish mortar used only for the masonry work from the sample, although there are possible techniques for solving this problem, such as the preparation of fine sections.[4]

A further problem, which is more difficult for building archaeology, is how to take the mortar sample from the surface of the masonry which set immediately upon being trowelled in place. In most cases, the surface mortar of masonry from the Middle Ages has weathered long ago; the surface has been repaired with a later layer of mortar; or the surface layer is lacking. If the sample is taken from the interior masonry of a structure it is possible that the mortar of the interior surface of the wall had set only some time later. In some cases, it can be malleable even hundreds of years after the original building work. It is not possible to date such wall mortar in any reliable way. The only possibility to find the original mortar is to reveal through

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[1] On the radiocarbon dating of mortar, e.g. Ringbom & Remmer 1995, pp. 1-17 and 60-68.

[2] Jungner 1994a, 1994b and 1995. Presented in Table 2 are the radiocarbon dates for Turku Castle (Hel- 3380-3383), Kuusisto Castle Table 4 (Hel- 3366-3378) and the Aboa Vetus Museum Table 1 (Hel -3624-3625).

[3] On the extensive discussion and debate on this method, see e.g. Carlsson 1993, pp. 109-118; Gustavson 1994, pp. 504-518; Hiekkanen 1994, pp. 215-216; Hiekkanen 1998, pp 142-144 ; Ringbom 1994, p. 470; Ringbom & Remmer 1995, pp. 12-17 and pp. 60-68; Ringbom 1997.

[4] E.g. von Konow 1995; Ringbom & Remmer 1995, pp. 60-68;

excavation a section of wall that was already in the ground during the Middle Ages, or to try to find a recess or niche in the wall still containing original mortar. There is also the problem of the amount of sampled material. In many locations, the old structures are so valuable that the required ca. 500 g -sample cannot be taken. In 1995-1996 the AMS dating techniques appear to have developed to permit analysis with only a 5 g -sample, which would in practice obviate the whole problem of damaging the walls.[1]

A third problem of building archaeology is the poor applicability of radiocarbon dates in medieval and later contexts. All radiocarbon dates generally have a margin of error at least 50-100 years. Though this has little bearing on prehistoric contexts, it is a definite problem in medieval studies. Moreover, studies concerning the 14th and 15th centuries have to take into account the fluctuations of the date curve, whereby two alternative dates are obtained for almost all samples from these centuries. The radiocarbon ages are usually given in calibrated ± form, but, particularly in connection with mortar, the one and two sigma dates are also used, which give a possibly more accurate picture. A one-sigma date gives the age of the sample with 68.3% probability, and two sigmas with a probability value of 95.4%

One possibility for greater precision and higher probability is to calculate a weighted average for several samples of mortar from the same structure, whereby the probable time of construction can be sought with greater accuracy.

Combining several samples of mortar, however, requires an interpretation of wall sections as belonging to the same structure and the economic opportunities to take sufficient numbers of samples from a single structure. This is possible in a limited context, but for example the dating of a whole castle with several samples from each structure is still impossible because of the high costs of analysis.

The reliability and usefulness of radiocarbon dates of mortar is an issue that has divided building archaeologists into two distinct camps. One group has confidence in the reliability of the dates and uses them to confirm their own results, while the other group rejects the method either completely or at least at this stage.[2]

[1] E.g. Ringbom & Remmer 1995, pp. 64-68; Ringbom 1997.

[2] E.g. Carlsson 1993, pp. 109-118; Gustavsson 1994, pp. 504-518; Hiekkanen 1994, pp. 215-216; Lilius 1996, pp. 224-227; Lilius 1998, pp. 54-56; Ringbom 1994, p. 470 and Ringbom & Remmer 1995, pp. 60-68.

Mortar dating and the stone churches of the Åland Islands

In her 1995 study on the churches of the Åland Islands Åsa Ringbom presents a revised mortar dating method known as AMS (Accelerator Mass Spectrometer). Employing the traditional radiocarbon method (dates given with the prefix Hel) and the AMS technique (dates prefixed AAR), Ringbom's study dates the medieval stone churches of Hammarland and Eckerö. Both methods are applied parallel and several samples of each component of the churches are combined into discrete entities.[3]

Of the dated samples from Hammarland Church, seven are of mortar for which a traditional radiocarbon date and an AMS date were established.[4] With reference to the samples, the chronological results do not appear to be very convincing, for only exceptionally are the dates congruent within a margin of 50 years.[5] It is therefore difficult to see how the older traditional radiocarbon dates and the new AMS dates can be combined.

[3] Ringbom & Remmer 1995, pp. 12-17, pp. 60-68, pp. 201-208 and pp. 285-294. A total of around 100 mortar samples were taken from the churches of Hammarland and Eckerö and were subjected to highly detailed and extensive geological investigation. See also Ringbom 1993, Ringbom 1994 and Ringbom 1997.

[4] Ringbom 1995, pp. 285-289, samples Haka 1, 22, 25, 28a, 30, 33, 34, 38, 39, 40, 43, 45, 46, 48.

[5] For example, there are several ages for sample Haka 1. The traditional date is 760 +/- 80 (Hel- 3099); the AMS date of the mortar alone (first section) is 545 +/- 65 (AAR 1463, 1); the AMS date including material mixed with the sample is 630 +/- 70 (AAR 1463, 2). From the same location is an AMS date of sample Haka 43. The mortar is given the AMS date of 490 +/- 80 (AAR 1463,2), while the mixed sample (second section) is 685 +/-80 (AAR 2074, 2). In several cases the traditional radiocarbon age and the AMS dates differ by several centuries. The same is true of Eckerö Church, where the ages established for the tower with various methods (Eka 15 and 16) differ by approximately 300 and 400 years. Moreover, the ages of two AMS samples prepared differently vary considerably (Ringbom & Remmer 1995, p. 65, pp. 285-294).

Lab. no.	$\delta^{13}C$	Age (BP)	1 sigma (68.3%) cal AD	2 sigma (95.4%) cal AD
Hel-3624 (L)	- 16.2	470 ± 60	1406 - 1478	1318 - 1342 1394 - 1524 1560 - 1630
Hel-3625 (L)	- 16.8	340 ± 60	1486 - 1606 1612 - 1638	1440 - 1666 1951 - 1952

Table 1. Radiocarbon dates obtained for mortar (L) from the Aboa Vetus Museum site. Calibration according to Stuiver et al. 1993. (Jungner 1995)

Radiocarbon dates for Kuusisto Castle

In the autumn of 1994 several samples of different kinds were taken for radiocarbon dating from Kuusisto Castle.[1] Applying the traditional radiocarbon method, twelve samples were dated, nine of which were mortar from masonry structures; one was a mortar sample from the ground; and two were charcoal samples. (Table 4.; Chapter 6.6.2.)

In 1992 the focus of the excavations was in the area of outer ward II, and for this reason most of the samples are from this area. Also the sampling locations of the main part of the castle were features that had revealed old masonry, or masonry interpreted as such, in connection with repairs and investigations. At Kuusisto Castle sampling thus primarily followed the repair situation and the need to obtain an approximately 500 g sample from each selected location. It was therefore not possible to establish chronologically all the stages of the castle; the sampling was more a test of the mortar dating method. Kuusisto Castle was a good location in this respect, since the earliest information on an episcopal manor or castle at the site is from 1295 and the later stages of the castle in the 16th century are known exceptionally well. Available historical sources tell that King Gustavus Vasa ordered the demolishment of the castle to begin in 1528. This royal order was apparently followed, since the finds from Kuusisto do not include, for example, 16th-century coins of later date than the 1520s. The next active period in the castle area as attested by historical sources did not begin until the 1870s when the excavation of the castle and repairs came under way.

It is difficult to interpret the mortar ages obtained for Kuusisto Castle.(Table 4) Only four of the samples are clearly dated to the period when the castle was in use (Hel 3367, 3373, 3374 and 3376), six samples are from the 15th-17th centuries, and two may date from as late as the renovation of the castle. A factor disturbing the interpretation is the calibration curve of the ^{14}C isotope[2], whereby all the sample of the 14th-16th centuries always have two one-sigma ages.

The interpretation of the samples is facilitated by the fact that the use of the castle is assumed to have ended in the late 1520s. Without this historical framework, the mortar dates would suggest that most of Kuusisto Castle was not built until the 16th and 17th centuries.[3]

Radiocarbon dates from the Aboa Vetus Museum site

In 1992-1995 Aboa Vetus, a museum of medieval history, was built in the area of the Rettig Residence in the centre of Turku. Archaeological excavations of considerable extent were carried out at the site under the supervision of the Turku Provincial Museum and the National Board of Antiquities. In the last stages, Dr. Markus Hiekkanen was director of research in the project. Hiekkanen has on several occasions expressed doubts regarding the reliability of the radiocarbon dating of mortar. In the Aboa Vetus project there were attempts to eradicate the sources of uncertainty as far as possible.[4] Although there were several suitable locations for taking mortar samples, the chosen sampling sites were ones for which dendrochronological ages could also be obtained (Table 1.).[5]

[1] Jungner 1994a.

[2] E.g. Ringbom & Remmer 1995, p. 13.

[3] At Kuusisto Castle the outer wall of outer bailey II is dated with both radiocarbon methods and dendrochronology. The foundation posts of the wall were felled in the winter 1438-39, and the radiocarbon age of the wall and the adjacent mortar is 1410-1464 (1 sigma), the most probable date being in the mid-1430s (Chapters 6.3.2. and 6.3.3.).

[4] E.g. Hiekkanen 1994, pp. 215-216.

[5] Jungner 1995.

The selected sampling locations were various structures in cellar 94:10, a large structure in the east part of the museum area. Several samples were taken from the cellar, of which three mortar samples were submitted for analysis (traditional radiocarbon dating) (Table 1). In addition to the dating, the samples underwent a thorough analysis of the mortar, including fine sections of selected samples. The purpose of the analyses was to eliminate limestone millions of years old from the samples, thereby making it possible to date only the time of setting or hardening, i.e. the masonry work itself. According to studies by Thorborg von Konow, this was successful and mortar samples could be forwarded for dating.[1]

All the samples to be dated were interpreted as belonging to the original fabric of the cellar. Sample 19 (Hel-3624) was from a point where the vaulting joined the south wall of the cellar and sample 32 (Hel-3625) was from the masonry of the east wall (Table 1.).

The dated samples do not appear to be from the same stage of construction, and accordingly their joint age has not been calculated. One of the samples appears possibly to be medieval, but the other can be given a date ranging from the close of the Middle Ages to the 17th century.

During the excavations two samples were taken of the log framework foundation in cellar 94:10, and a third one from an upright post. These dendrochronologically dated samples (archaeologically numbered 85, 86 and 88) are dated so that in one of the samples the last preserved year ring is from 1395; in the other two it is from 1404. Timber sample no. 85 was felled between 1404 and 1414, no. 86 between 1395 and 1405 and no. 88 between 1404 and 1406.[2] It thus appears that the timber of the log framework foundation of cellar 94:10 was felled between 1404 and 1405, and the cellar was built afterwards.

In this case, the dendrochronological ages and the dates obtained for the mortar could not be combined very well. The calibrated age of mortar sample no. 19 did not extend to 1404-1405; the one-sigma date begins at 1406 and the two-sigma date covers the period in question. It can be noted of sample 32 that it is in no way suited to the log framework, but suggests a clearly younger date.

This limited dating experiment carried out at Aboa Vetus does not imply that the mortar dates are in some way systematically incorrect, as suggested for example by Ronnie Carlsson in his studies on Kastelholm Castle.[3] It should also be noted that at Aboa Vetus the sample was definitely of the masonry mortar and that for example in the calibrated ages the ± margins are definitely more precise than in the other investigated locations. In the near future a definite problem of mortar samples will be the evaluation of the older dating work, in which perhaps not all means were used to purify the samples of natural limestone.[4]

5.2.1. Radiocarbon dates for Turku Castle

In the Turku Castle project in 1992, four mortar samples were taken under the direction of Knut Drake from the east tower and so-called "Lords' Cellar" area of the main part of the castle in the northeast part.[5] There would obviously have been several other sampling locations in the castle area, but the number of samples was limited to four for economic reasons. All four were associated with Drake's study on the architectural history of the main part of the castle (Fig. 47).

These samples are discussed in the present work, because they provide additional data on the history of construction of the east face of the main part of the castle. This side of the castle also influences conclusions concerning the various stages and age of the eastern outer bailey.

The investigated locations were carefully chosen to provide further light on the history of construction of the NE part of the main section of the castle. This history of this part of the castle and the early masonry structure located there has been discussed in several studies. In summary, it can be noted that according to Kronqvist and Gardberg an encircling wall was constructed in the first stage in the late 13th century, and the east tower and the small stone building in the NE corner of the courtyard was added to it. Around the turn of the 14th and 15th centuries the stone house was raised and fitted with a rare stellar vault. In the same connection the main part of the castle was enlarged towards the east with the addition of a new end wall connected to the walls of the outer bailey of the east wing.[6]

[1] von Konow 1995.

[2] The dendrochronological data on the Aboa Vetus excavations are available in copied form in the museum archives.

[3] Carlsson 1993, pp. 199-205.

[4] On the latest methods, see e.g. Ringbom & Remmer 1995, pp. 12-17, Ringbom 1997.

[5] Jungner 1994b.

[6] E.g. Gardberg 1959, pp. 34-51; Gardberg 1967 pp. 43-44; Kronqvist 1947, pp. 24-32.

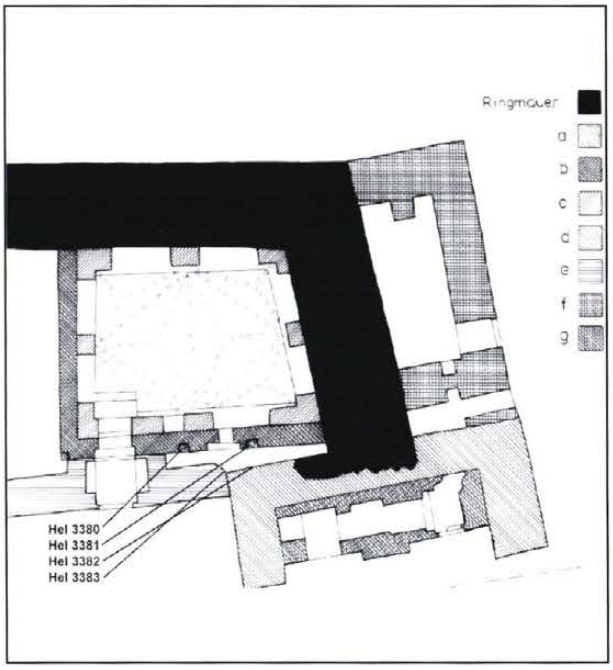

Fig. 47. The northeast section (so-called Lords' Cellar) of the main part of Turku Castle. Four mortar samples (dated Hel- 3380-3383) were taken from the various stages of construction of the northeast corner (Jungner 1994b). This illustration is based on Drake's suggested history of construction for the northeast part of the castle (Drake 1993, p 30).

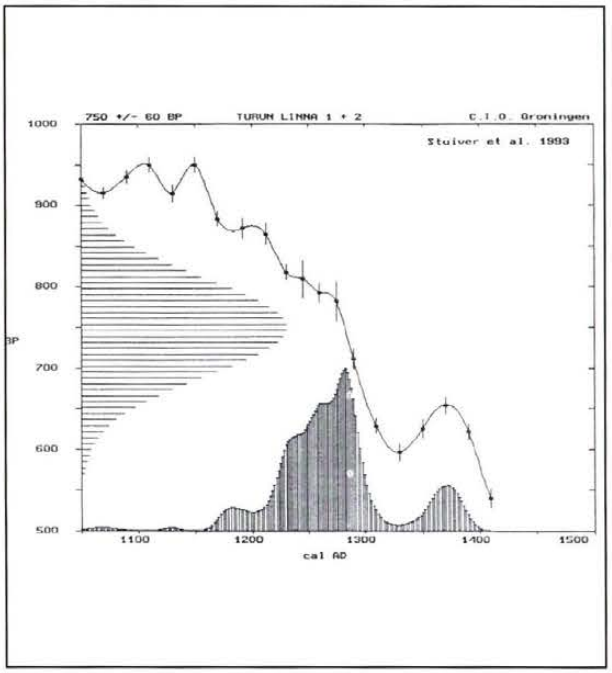

Fig 48. Two radiocarbon dates, Hel-3380 (Turun linna 1) and Hel-3381 (Turun linna 2), obtained from mortar samples from the south wall of the Lords´ Cellar (detailed results in Table 2). (Jungner 1994)
The diagram combines the results for samples from the same stage of construction. Basing on this, it can assumed that the walls of the Lords´Cellar were most probably built in the late 13th century.

According to Knut Drake, the east wall was built in the 13th century. In the initial stage, there was a wooden building in connection with it, and the "Lords' Cellar" and east tower were not built until the 14th-15th centuries. The east end was not extended until the late 15th century.[1]

Two of the four mortar samples were from two different elevation in the outer wall of the stone building (the "Lords' Cellar"). According to Drake, sample *Turku linna no.1* (Hel-3380) was from the original single-storey structure, and sample *Turku linna no. 2* (Hel-3381) was from its raised upper part.[2] The rendered mortar surface had clearly survived in the upright timber niches of the south wall, which according to Drake were made when the stone house was under construction.[3]

The ages of the samples (Hel-3380 + Hel-3381) are given in Table 2. The dates are almost identical, placing both samples in the 1280s-90s. At a later stage, samples 1 and 2 (Hel-3380 + Hel-3381) were interpreted as belonging to the same structure and were jointly estimated as dating the masonry of the wall to the years 1230-1296 (1 sigma) and with considerable probability to the 1280s-90s (Fig. 48).

It is difficult to link the mortar dates to the earlier research tradition, because — in contradiction to all earlier interpretations — the south wall of the "Lords' Cellar" would thus have been two storeys high from the very beginning. In other respects, the radiocarbon dates are in agreement with the ages suggested by Kronqvist and Gardberg, according to which the stone house of the first stage is from the close of the 13th century[4].

[1] E.g. Drake 1984, pp. 118-133 and Drake 1993a, pp. 27-35.
[2] Jungner 1994b.
[3] E.g. Drake 1984, pp. 118-133.

[4] Gardberg 1967 pp. 43-44; Kronqvist 1947, pp. 24-32.

Lab. no.	$\delta^{13}C$	Age (BP)	1 sigma (68.3%) cal AD	2 sigma (95.4%) cal AD
Hel-3380 (L)	- 16.8	760 ± 90	1174-1196 1206-1304 1360-1380	1044 - 1092 1114 - 1142 1156 - 1400
Hel-3381 (L)	- 15.2	740 ± 80	1221-1306 1356-1384	1060-1076 1124-1132 1160-1404
Hel-3382 (L)	- 14.9	690 ± 80	1275-1326 1332-1396	1214-1422
Hel-3383 (L)	- 16.4	770 ± 80	1174-1196 1206-1298	1046-1092 1114-1142 1156-1322 1336-1396
Hel-3380 + 3381			1230-1296	1170-1314 1348-1390

Table 2. Radiocarbon dates, Turku Castle. Calibration according to Stuiver et al. 1993. (Jungner 1994b). L = Mortar sample

Sample no. 3 of this series was taken from the north wall of the east tower. The sample came from what is probably the oldest part of the tower, or alternatively from the joint of two parts of different age, whereby its reliability poses a problem. The reason for this is mainly the amount of mortar that is required. The necessary amount is not to be found in a small area of a normal stone wall.

Sample no. 4 (Hel-3383) is the most problematic case in the whole series. It is from a highly indefinite feature of mortar fill on the west side of the east tower. All experts agree that this structure is the youngest component of the NE part. However, the radiocarbon age of this sample is almost identical to samples one and two (Table 2.).

One possible explanation is that there was a building of the same age as the "Lords' Cellar" in this location. This building was subsequently torn down and its mortar and stones were used in the fill of the later wall. It is also possible that this sample in particular reveals how little reliable data can be obtained by the mortar dating method.

The four mortar samples from the NE section of the main part of Turku Castle clearly reveal the difficulty of interpreting the results. The dates are so broad that individual researchers can easily find results supporting their own studies, particularly within the broader probability limits (e.g. 2 sigma). On the other hand, all the samples are dated to the Middle Ages and mostly to the 13th and 14th centuries, i.e. the period when the structures were built, at least according to some scholars. The main problem lies in the fact that the dates for Turku Castle (and Kuusisto and the Aboa Vetus museum) were obtained with the traditional radiocarbon method. With reference to the Åland churches, the differences between this method and the AMS technique are obvious. Therefore it is extremely difficult to judge the respective reliability and error of the dates obtained.

The ultimate inadequacy of this method is its lack of any proper means of testing. Although the samples have been carefully cleaned, it is in essence a "blind" process. The cleaning seems to take known factors into consideration, but a great many unknown factors remain unexplored, causing variation in results regardless of whether the normal or the AMS method is used. So far, the results have been tested preferably with criteria associated with the history of architectural styles. Consequently, the ^{14}C dating of mortal, a natural-scientific method, relies on the dating of style, a humanistic method. Scientific dating should under all circumstances be an independent method in order to serve its purpose. The risk of circular reasoning is obvious, and there can even be the outcome that a humanistic scholar will choose those scientific results which suit his or her own preconceptions.

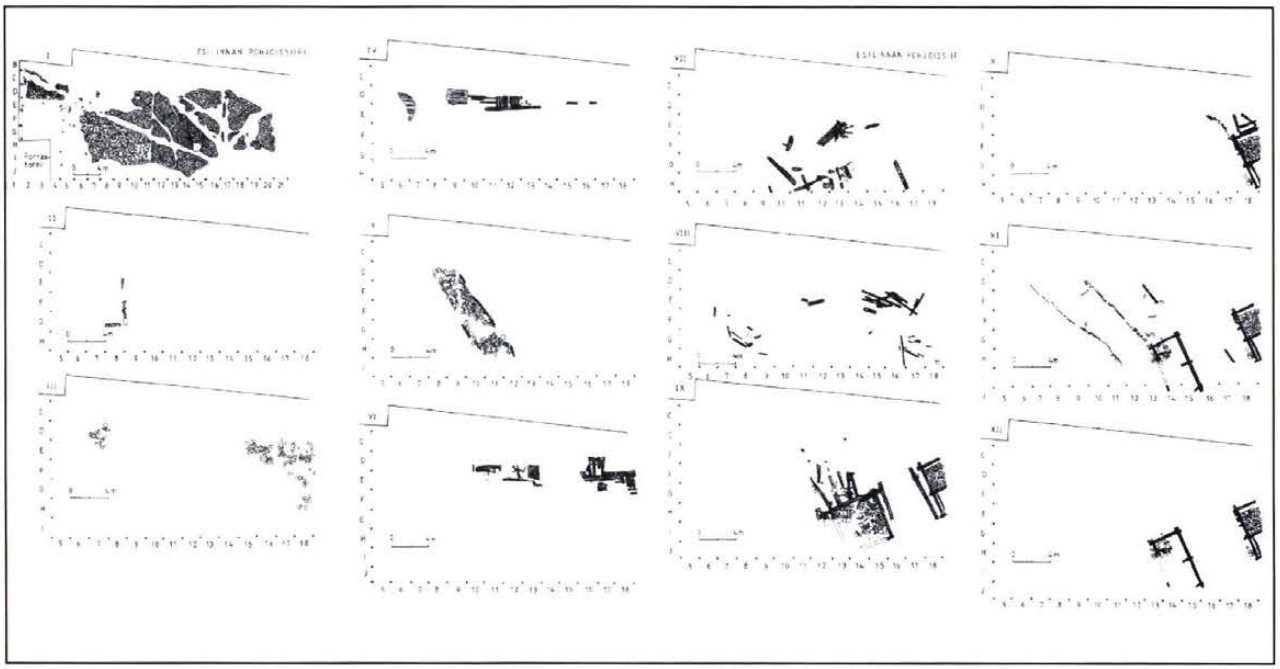

Fig. 49. Excavations of the ward area of the east outer bailey.
According to field work conducted by Kykyri, the ward area of the east outer bailey underwent twelve stages of use (I-XII in chronological order. XII = the oldest stage/lower right). It should be noted that there were only a few wooden buildings in the ward, and the suggestion of the outer bailey wards as an almost urban environment does not find much support. (Illustration from Kykyri 1993, p. 85.)

5.3. The Archaeological Dating of the Eastern Outer Bailey

Extensive excavations were conducted in the area of the eastern outer bailey in the 1970s and '80s. Within the Turku Castle project, this archaeological data was studied by the archaeologists Marita Kykyri and Aki Pihlman, both of whom studied the same material from their respective approaches, presenting the results of their work in a seminar publication in 1994.[1] Subsequently, Kykyri has presented new results and ideas mainly verbally in the meetings of the project (spring 1994) and Pihlman in 1995 in his licentiate thesis in archaeology presented at the University of Turku.[2]

These researchers have different views of the history of the courtyard area of the eastern outer bailey. Their main difference is that Kykyri distinguishes a total of twelve different stages of use in the courtyard area (Fig. 49), while Pihlman distinguishes only four. (Fig. 46)

There are also differences in the interpretation and dating of the posts traversing the yard area.[3] Moreover, archaeobotanical studies of the soil layers of the excavated area of the courtyard have been carried out under the direction of Marjatta Aalto, but she could only refer to the excavation levels, and it is extremely difficult to link them to the history of the courtyard as outlined by Kykyri and Pihlman.[4]

In an article from 1994, Kykyri dates the rows of posts traversing the outer bailey courtyards and the western pier caisson to the early 15th century, mainly with reference to dendrochronological dates. The most important point in view of the stratigraphy of the whole courtyard area is Kykyri's interpretation that the rows of upright posts are from the oldest stage of the courtyard. All the other layers have formed on top of them. She claims that in addition to the rows of posts and the pier caisson part of the overlaying strata were also inundated. She dates the mortar layer covering the whole courtyard area to the 15th century, suggesting that it may be associated with the construction of the main part of the castle or the outer bailey.[5]

[1] The publication was entitled "Tutkimuksia Turun linnasta 1". Drake 1994. The related seminar was held in the autumn of 1992, at which time most of the research was still in its initial stages.
[2] Pihlman A. 1995.
[3] Kykyri 1994, pp. 83-87 and Pihlman A. 1994, pp. 74-77.
[4] Aalto 1994, pp. 21-38.
[5] Kykyri 1994, pp. 82-87; oral communication April 1997.

In an article from 1994 Pihlman combines the rows of posts and the pier caissons as a single construction stage, whose internal divisions cannot be established in further detail. The caissons were related to the road leading from the town and the multiple rows of posts were laid to reinforce the courtyard area, on dry land, from erosion. The posts were sunk through older layers. The log bridge caissons may be from as early as the second half of the 14th century, and the supporting posts of the courtyard may be from the close of the 1420s, as indicated by dendrochronological results. According to Pihlman, the mortar layer covering the whole courtyard area dates from the middle of the 15th century. The mortar was spread over almost all of the yard area (the excavated area was approximately 250 square metres) for reasons of hygiene to cover three bodies discovered in the excavations.[1]

The completely different interpretations of these archaeologists concerning the courtyard area of the outer bailey greatly make it difficult to link the archaeological data to the architectural history of the main part of the castle or the outer bailey. Both experts clearly follow the dendrochronological dates established for the spruce posts. In my opinion the reliability of these dates should be viewed quite critically.

In summary it can be noted that Kykyri claims that the use of the outer bailey courtyard did not begin until the 1420s and '30s, when the area was still partly submerged. According to Pihlman, the area was mostly dry land and used as the castle's ward or courtyard area from as early as the second half of the 14th century. Kykyri's interpretation maintains that the walls could have come under construction during the 15th century, while Pihlman suggests the previous century.

I would suggest an interpretation whereby the spruce dates are set aside and it is assumed that the other dendrochronological samples represent wood that was in primary use. Accordingly, the oldest pier caissons and possibly the posts date from the early 14th century as well as mortar layer covering the courtyard. (see chapter 5.1 on dendrochronology)

[1] Pihlman A. 1994, pp. 74-77 and Pihlman A. 1995, pp. 159-168.

5.4. The Construction of the Outer Bailey and Related Geological Studies

The Turku Castle project included a number of geologists working under the direction of Gunnar Glückert. The results of their work are given in a report from 1992 and in article published in 1994. The geologists were primarily concerned with two trial sections excavated near the castle, which were used to investigate the history of the formation of the isthmus joining the castle area to nearby Kakolanmäki hill. The geologists' brief did not specifically concern the formation history of the castle environs, because the research data do not directly apply to this area, although results concerning the emergence of the whole area were also presented.[2]

The most significant result is that as late as the 15th century the isthmus between the castle area and Kakolanmäki hill was still under a metre or so of water and that this feature did not emerge until the mid-16th century. A further result, albeit questioned already in the report, was that the main area of the castle was dry land as early as AD 850-1100 and that the same was true of the whole eastern outer bailey with the exception of the round tower in 1100-1300. The round tower area and the immediate vicinity of the castle became dry land between 1350 and 1550. The study notes that for example the area traversed by the rows of posts in the outer bailey courtyard had already emerged as dry land between AD 500 and 800.[3]

It was already noted in the 1992 seminar on research concerning Turku Castle that there are distinct discrepancies between the archaeological and geological results. Kykyri's interpretation of the pier caissons and post rows from the late 1420s are in no way congruous with the presented history of isostatic land uplift in the area.[4]

On the other hand, Pihlman appears to accept the geological results, to which he refers in his discussion of the bridge caissons and the 14th-century bridge leading from the castle to Turku, although the geologists claim that the area did not emerge from the sea until the middle of the 16th century.[5]

It is hard to believe that the road to the castle would already have been in use in the 14th and 15th

[2] Glückert et al. 1992 and Glückert & Paatonen 1994, pp. 9-19.
[3] Glückert et al. 1992; Glückert & Paatonen 1994, pp. 9-19; Ristaniemi et al 1997, p 401.
[4] Kykyri 1994, pp. 82-87.
[5] Pihlman A. 1994, pp. 76-77 and Pihlman A. 1995, pp. 159-168.

centuries, at which time it would have been 1-1.5 metres below mean water level. At times of seasonal high water levels it would have been under 2-3 metres of water. There is no archaeological or geological evidence of the possible raising of the road. In discussing the posts Pihlman points to considerable fluctuations of water level, which would have made it necessary to terrace the courtyard area. The geological results, however, show that the posts were sunk at least three metres above the mean water level of the 15th century, which means that flooding would have been truly significant (Fig. 50).

In my opinion, the credibility of the geological results is undermined by the fact that the data was collected totally independently of archaeological observations in the castle area.[1] The results of archaeological excavations of the outer bailey courtyard and walls could have been applied here as well as the data from several minor excavations for example on the river bank south of the castle. The suggestion that the shoreline in the castle area would have been shaped by nature until the 17th century appears untenable in the light of archaeological data.[2]

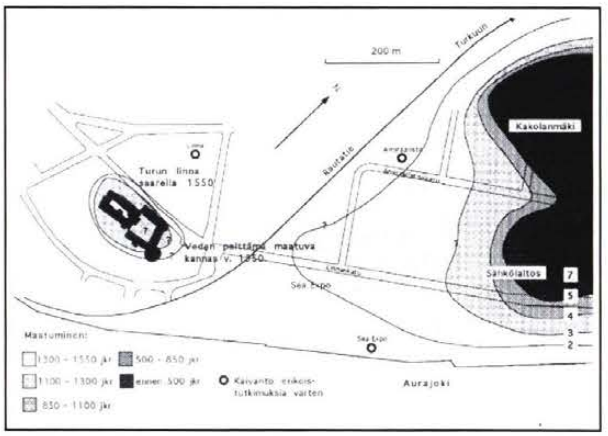

Fig. 50. The development of the environs of Turku Castle during historically recorded times as indicated by geological studies. According to studies by Glückert, the site of Turku Castle was an island until the 1550s. There is little geological data pertaining to the castle island, and the interpretations are therefore questionable. The geological information, however, suggests that the area of the whole east bailey and the upper south ward became dry land already in the period 1100-1300 AD. (Illustration Glückert & Paatonen 1993, p. 13, fig. 3).

5.4.1. Shore displacement

Post-glacial shore displacement in the Baltic region has mainly been studied with the methods of the natural sciences. Geological studies have proceeded from linear land uplift,[3] which according to recent studies is 4.14 ± 0.4 mm/yr in the Turku region.[4]

This linear shore displacement is no doubt suited especially well to studying long-term phenomena. It must be noted, however, that in Stone Age archaeology this view has long been criticized.[5] With regard to medieval archaeology, one of the most significant research areas in this respect is Central Sweden and especially the Stockholm region, where the history of shore displacement has been investigated by numerous geologists, geographers and archaeologists.[6]

During the 1980s results obtained in Stockholm also spread among Finnish archaeologists. It had been observed in medieval towns that there were many stone buildings and cultural layer features that did not correspond to linear shore displacement.[7]

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[1] According to archaeological field work, there are cultural layers 3-4 metres thick in the eastern part of Turku Castle. Despite this, the discussion on shore displacement proceeds from present-day elevation contours. This method cannot be correct in dealing with historical sites where ground level has been significantly raised through human action.
According to the geological report, the courtyard area of the eastern outer bailey is above the five-metre contour line. This is in sharp contradiction, for example, with the fact that for example the rows of posts in the courtyard area were at an elevation of ca. +200-+290. These were overlaid by cultural layers, whereby the original surface of the ground in the centre of the yard was at ca. +200-+250. The discrepancy with the geological results is of the order of at least three metres (In terms of shore displacement this implies a range of ca. 600 years).

[2] Glückert at al. 1992, p. 13. "When this study was in progress it was assumed that the shoreline was shaped by natural processes until the early 17th century and that there was little human impact on its location."

[3] E.g. Glückert 1977.

[4] Glückert 1992, p. 13; Ristaniemi et al. 1997, pp. 397-406. In earlier studies, average land uplift is given as ca. 5.2 mm/yr (Kääriäinen 1953). With regard to medieval Turku, the most precise studies are by Olavi Laisaari. Laisaari takes into account the rate of land uplift and the rise of mean sea level (Laisaari 1974 and Laisaari 1984; see Gardberg 1974.).

[5] See e.g. Arponen & Hintikainen 1995; Schulz H. 1996; Siiriäinen 1981.

[6] E.g. Ambrosiani 1981, Ambrosiani 1982, pp. 71-80; Hansson 1976, pp. 21-22; Åse 1980, pp. 83-91; Åse 1984, pp. 167-172; Ödman 1983, pp. 26-42; Ödman 1987, pp. 45-75, Ödman 1998, pp. 21-33.

[7] This problem has been discussed most extensively by Markus Hiekkanen in his research report on medieval Rauma. Hiekkanen extrapolates the results for the Stockholm area to Rauma (Hiekkanen 1983, pp. 37-39) and Naantali (Hiekkanen 1988, pp. 60-64) Pihlman has pointed to the need for further studies in connection with medieval Turku (Pihlman A. & Kostet 1984, pp. 142-147).

year/ researcher	AD 1300	AD 1350	AD 1400	AD 1450	AD 1500	AD 1550
Gardberg (1)	3.4		2.8		2.3	
Laisaari (2)	3.3	3.0	2.8	2.5	2.3	2.0
Glückert (a)(3)			3.0			
Glückert (b)(4)	3.0	2.8	2.6	2.4	2.2	2.0
Paatonen (5)					2.0	
Wahlberg (6)	2.7	2.4	1.9	1.5	1.6	1.7
Hiekkanen (7)	2.4	1.7	1.2	1.0	1.1	1.6

Table 3. Suggestions presented by various researchers concerning medieval shore displacement in Turku and its nearby regions. Some of the figures are calculated to permit comparison of data from various investigations and studies.
1 = Gardberg 1967, pp. 11-12, gives the sea level of the late 13th century and the average rate of land uplift (52 mm/yr). Estimates for later period are calculated from this data (K. Uotila).
2 = Laisaari 1984, pp. 37-49. Laisaari takes into account the rate of land uplift and the rise of mean water level. The results are given regressively from the year 1950 at 100-year intervals. The intermediate values are calculated from the given values (K. Uotila)
3 = Glückert 1977 pp. 24 and 30.
4 = Glückert et al 1992; Glückert and Paatonen 1994, pp. 12-13.
Recent mareographic studies show the rate of land uplift to be 4.14 +/- 4 mm/yr. This study gives shore displacement in broad terms with reference to 1-metre contour intervals. According to the results, the dry land above the 3-metre contour formed between AD 1100 and 1300 and that above the 2-mete contour between AD 1300 and 1550. General figures for different periods are calculated from this data (K. Uotila).
5 = Paatonen 1994 p. 53. This estimate takes into account the trend established in Swedish studies.
6 = Wahlberg 1994
7 = Hiekkanen 1988, pp. . 62-63. Hiekkanen bases his studies on the 5.4 mm/yr shore displacement curve, which differs slightly from the curve for the Turku region (5.2 mm/yr), but the difference is only 2 cm per century, which is insignificant in the present connection. The figures given in the table are calculated from Hiekkanen's curve with the parameters of measurement. (K. Uotila)

The various results of shore displacement studies were discussed in the Turku Castle project, but in this connection the geologists pointed to the insufficient documentation of the archaeological data and the lack of detailed investigations of the foundation layers of most of the investigated locations and features.[1]

There has, however, been some kind of reappraisal. In an article published in 1994, Paatonen also considers fluctuations of sea level during the Middle Ages.[2] It is possible that in natural-scientific studies a margin of one or two metres in sea levels is sufficiently accurate, but in historical archaeology greater precision on the levels of the Baltic at

[1] Discussions with Gunnar Glückert and Erkki Paatonen in 1992.

[2] Paatonen 1994, p. 53.

different times is needed.[1] This is because stone buildings could not have been constructed (at least with mortar) in locations below water level.[2] This issue is of broader importance for studies in medieval and 16th-century history, as rapidly developing research in environmental history is based on scientific results concerning shore displacement.[3] It is difficult to obtain precise results for Turku Castle, because the eastern outer bailey was built almost completely on clayey sediments which prevents precise observations of the original elevation of the structures.

On the other hand, there are structures in other medieval castles that were built on dry land. For example at Kuusisto Castle several components were built on gravel, glacial till or bedrock. The most important of these is tower no. 12, located NW of the main part. The western exterior wall of the tower was built on bedrock beginning at elevation +180-190 a.s.l.(the checked elevation according to the NN 60 system is +160-170 a.s.l.). The layers extending to the west wall of the tower have revealed late 15th-century coins and in view of the history of the castle, the tower is at any rate older than 1528.[4]

In 1991 a joint research project was begun at Kuusisto Castle with the purpose of establishing the geological history of the castle area over past millennium. One of the starting points of the new studies was to seek indications of fluctuations in the level of Baltic during the Middle Ages and to combine with the studies all the archaeological and geological material collected from the area. The tentative results suggest that shore displacement in the environs of Kuusisto largely followed the course outlined by Swedish researchers and Hiekkanen.[5]

Table 3 presents the views of most researchers concerned with shore displacement in the Turku region. Gardberg's and Laisaari's views are based on the 5.2mm/yr rate of isostatic land uplift and are quite close to each other.[6] Glückert's latest results are based on the 4.14 mm/yr rate of uplift and the figures are therefore lower. On the other hand the figures suggested by him only concern the turn of the 15th and 16th centuries, in which connection he has taken into account the recent trend of Swedish studies. Accordingly, sea level would have been around 2 metres above present level around the year 1500. Basing on the Kuusisto material, Wahlberg arrives at clearly lower values. The largest discrepancy with other researchers is in Hiekkanen's results, although his and Wahlberg's interpretations of the situation contain the same elements. The main difference is in the degree of fluctuation; Wahlberg's figures are considerably more modest than Hiekkanen's.

With regard to the turn of the 13th and 14th centuries the differences among the views of different researchers are at most ca. 0.9-1.0 metres, but from that point onwards the discrepancies grow and by the mid-14th century they can be as much as 1.3 metres. The largest difference in suggested sea level is in connection with the beginning of the 14th century. According to Gardberg, Laisaari and Glückert, the shoreline of the period was 2.6-2.8 metres higher than at present; Wahlberg suggests 1.9 metres and Hiekkanen 1.2 metres. The figures differ as much as 1.5 metres. The difference is the same in the mid-15th century. Both Hiekkanen and Wahlberg claim that during the 16th century water levels rose; Wahlberg gives the figure 0.2 metres and Hiekkanen suggests a rise of ca. 0.9 metres.

The components of the outer bailey of Turku castle was mostly built on clayey soil and had clearly sunk considerably after construction. Therefore neither shore displacement results can be used with any certainty to date the outer bailey. It can be noted, however that the SW and NW walls of the eastern outer bailey were built partly on bedrock and partly on clay. The foundations of the walls on the bedrock were at elevations +3.00-+4.00 a.s.l. and on clay at +200+250 a.s.l. These elevations fit both interpretations. On the other hand, the posts traversing the courtyard of the eastern outer bailey (elevation +200-+250 a.s.l.) and the associated features of cultural layer can be given a medieval

[1] E.g. Hiekkanen 1988, pp. 60-61. The connections of fluctuations in shore displacement with climatic change in the Middle Ages is difficult to interpret. On recent studies of medieval temperatures see e.g. Bell & Walker 1992; Briffa et al. 1992; Heikinheimo 1995; Karlen & Rosqvist 1995 and Zetterberg 1994. According to dendrochronological studies carried out in the Turku region, a distinct and permanent change in the growth of pine occurred in the 1480s see Sartes & Uotila 1997, p. 123.

[2] The elevation of buildings has often been a point of reference for suggestions of the chronological limits of construction. E.g. Gardberg 1967, pp. 9-12; Gardberg 1974; Laisaari 1974; Laisaari 1984.

[3] On environmental history, see e.g. Heino 1995. On the applications of linear shore displacement, e.g. Harju 1995, p. 69. In my opinion there are grounds for seriously considering the problem of how for example a rise in water levels of 0.5-1.0 m influenced the economy of Finland's coastal regions in the late 15th and 16th century. For example the large shore meadows would have been inu

[4] On the elevation of the various components of Kuusisto Castle, see Wahlberg 1994. See Suna 1994b on the age of the structures.

[5] Wahlberg 1994.

[6] The 5.2 mm/yr rate is not necessarily incorrect even today. Written comment by Research Director Matti Saarnisto of the Geological Survey of Finland, January 1997. See also Saarnisto & Grönlund 1996. Cf. Ristaniemi et al 1997.

date. Their elevation is more in agreement with Hiekkanen's views than Wahlberg's interpretations.

A fluctuating shore displacement curve could provide a better explanation for the connection of the castle to the mainland. Assuming that sea level sank to under two metres above the present in the 14th and 15th centuries, the isthmus with Kakolanmäki hill, as assumed by Pihlman could thus have formed. When water levels rose in the 16th century, this route would have been inundated or at least waterlogged and would not have been available for use until the early 17th century.

5.4.2. Geological studies and the walls of the eastern outer bailey

The considerable setting and leaning that is characteristic of all the walls of the eastern bailey can be explained with reference to varying shore displacement as follows. The areas of clayey soil beneath the walls and towers that had already dried once (in the 14th and 15th centuries) we inundated again at the turn of 15th and 16th centuries, in which connection the load bearing capacity of the clays changed and the whole masonry-built outer bailey either began to lean towards the Aurajoki River or settled directly downwards (east and north parts)[1]. In terms of building archaeology this sinking can be date to before the middle of the 16th century, as the brick walls of the outer bailey that were built in the 1560s were constructed directly on top of the sunken walls. Historical sources tell that in 1505 most of the castle walls collapsed, and it appears highly probable that this involved repairs to the south section of the wall.[2]

A traditional interpretation of shore displacement makes it more difficult to establish a geological cause for the sinking of the outer bailey structures. One possible explanation is that the walls had sunk to their present elevation immediately upon being built. This, however, is difficult to accept, because the outer bailey walls display clear signs that the sinking involved existing walls, such as the completely leaning structure of the north wall, which was not repaired until the middle of the 16th century. A further example is provided by the high rooms (ca. 4-5 metres) of the northeast and southeast towers, which suggest that these rooms originally had some function. It was only at a later stage that for example a well was constructed on the log framework on the tower and a water pipe was built through the wall.

It is difficult to imagine a situation where the outer bailey, built in the late 14th century and at the very beginning of the following century, would have sunk immediately after construction so that only some four metres of the eight or nine-metre walls would have remained above ground. A settling of the walls of this order would have greatly hindered their use in the defence of the castle. It can be assumed that repairs were undertaken as soon as possible.[3] The sunken section of the wall would, however, have had to await repairs and restoration for some 100-150 years. The repairs and raising of the walls must be dated to as late as the 16th century.

5.5. Historical Sources on the Construction of Outer Baileys

In most cases only a few indirect medieval sources on the various parts of castles are available, but a distinct change in their quantity and quality takes place in the 16th century. The system of crown administration reformed by King Gustavus Vasa began to produce large numbers of series of documents that even make it possible to follow the construction of a castle on a yearly basis. In some cases, the sources can also point to earlier structures and thereby shed light on the medieval history of the castle in question. With regard to 16th-century sources and construction, the history of Turku castle is known from Gardberg's studies.[4]

The events centring on medieval castles that have left an imprint in sources usually concerned their halls and chambers, and the outer wards and baileys have had a secondary role, remaining beyond the scope of sources.[5] The outer baileys of medieval castles in Finland are mentioned in only a few documents. The oldest source is from 1427, when the assizes of the *lagman*, or crown advocate, were held in Raasepori Castle. [6]

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[1] A similar sinking of outer bailey structures built on clayey soil can be seen in most of the other medieval outer baileys in Finland.

[2] FMU VI 5110 and 5244. The collapsed area of 1505 and the repairs of 1507 can only be indirectly linked with the eastern outer bailey. See Gardberg 1959, pp. 46-47.

[3] Concerning tower B (the round tower) of Kuusisto Castle, Erkki Paatonen suggests that the tower had sunk 90% of the total depth to which it ultimately sank in a period of some 40 years (Paatonen 1994, p. 56). This suggests that the main changes to the foundations were carried out quite soon after the completion of the building or the wall section.

[4] Gardberg 1959.

[5] Even the main meeting rooms and areas of the castles may have remained unmentioned in sources. For example, the so-called "Lords' Cellar", built in the early 15th century at Turku Castle probably served as the meeting place, but this point is not mentioned in a single written source (Drake 1984, p. 132).

[6] FMU 1824 (3.2.1427). See Gardberg 1993a, pp. 85-86.

The oldest references to the outer bailey of Turku Castle are from July 1463, when a meeting convened under the direction of King Christian of Oldenburg, "in the cabbage field below in the outer bailey of Turku Castle".[1] In two other sources from the same month it is mentioned that the court convened in the outer bailey.[2]

At both Turku and Raasepori an important meeting was held in the outer bailey, for which reason this exceptional location was mentioned in the records. I feel this clearly shows that there does not have to be any direct connection between the historical sources and the construction of the outer baileys; the outer bailey can be considerably older than its first mention in sources. For Turku Castle, however, the source from 1463 provides a clear chronological framework, implying that at least some kind of outer bailey existed there.

The following items of information most probably referring to Turku Castle are from 1505. On 25 March 1505, the commandant of the castle wrote to the Regent in Stockholm to report that part of the castle walls (*mantelmur*[3]) had collapsed and that the tower would also collapse.[4] Basing on field work conducted in the 1950s, Gardberg places the collapsed section of the wall in the south part of the eastern outer bailey, where there are older structures beneath the present south wall and the tower.[5] The oldest components lean at angles of 14-17 degrees towards the river and it appears that the leaning was very rapid with a resulting collapse.[6] An exceptionally rapid collapse of the walls is also suggested by the fact that a year earlier, in July 1504 Regent Svante Sture inspected the castle and noted that everything was in order.[7] The reconstruction of the walls was completed at the end of May 1507.[8] Completed at that stage was a c. 40-metre section of wall corresponding to the south wall of the eastern outer bailey. This means that we may assume the repairs to the walls to have already begun in 1505 and 1506.[9]

Combining historical sources and building archaeological data is often a challenging opportunity that opens up many interpretations. With regard to the outer bailey of Turku Castle, Gardberg has suggested that the eastern outer bailey was always referred to as the outer bailey while the southern outer baileys were known as the outer wards. Another unequivocal starting point consists of the facts that the old gate tower stood at the site of the present south hexagonal tower, the old south tow er preceded the southeast tower and the present northeast tower was previously known as the north tower.[10] This conception, based on 16th-century sources, may well be correct, although some of the data do not fit it very well.

The main problem concerns the old gateway, which was still located in the area of the present hexagonal tower in 1549. At present, the two bottom storeys and the adjacent grey stone walls remain of the original tower. None of these features reveals the

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[1] FMU IV nro 3207 (25.7.1463)."J kolgardhen nidher i forborgaenne for Abo sloth". See Gardberg 1959, p. 45, Klockars 1979, p. 82. The reference from 1463 was translated in 1891 as ...down in the cabbage field below in the outer bailey in front of the castle (Snellman 1891, p. 4).
During Middle Ages the term "Kålgård" specifically meant a cabbage patch, or field, the main cultivated area in the castle. (E.g. Hjemqvist 1961, pp. 263-267).

[2] "Sittia for retta i forborgen" from July 18, 1463, FMU IV 3204. "I forborghen paa Aabo", July 21, 1463. FMU 3205.

[3] According to Ahrenberg, this term generally referred to the outer bailey wall (Ahrenberg 1901, p. 49). Later, it was defined as the wall encircling the main tower, with Kärnan in Helsingborg as an example. (Lundberg 1966, p. 342).

[4] FMU VI 5110
"at ther ramelet eth stort sticke neder aff manthel mwren wetthet törn, som star i moth skipbroffwen, som swa forst vtlwthe, oc er storlige til fare, at thet torn faller neder w, that tiallen ganger vth aff jordhen". See Ahrenberg 1901, pp. 54-55; Gardberg 1959, p. 46;

[5] Gardberg 1959, pp. 46-47. According to Ahrenberg, this part was the tower and section of wall furthest to the southwest (Ahrenberg 1901, pp. 54-55), which may imply the southern outer ward. There are no definite observations of a tower in the southern outer ward area and no investigations have revealed a marked leaning or collapse of the wall.

[6] A gradient of approximately 11 degrees would have been enough for the collapse of the old structure, which means that the south wall and tower had clearly passed the critical limit before collapsing (cf. Parland 1994, pp. 32-34).

[7] Kuujo 1981, p. 33. The interpretation that the poor condition of Turku Castle would have resulted from Svante Sture's need to collect all available tax revenue to Stockholm does not appear very plausible (Suvanto 1985, p. 175). It is hard to imagine that a whole wall structure would collapse within a year because of insufficient tax revenue.

[8] FMU VI 5244.
"Jak haffde gerne senth eder herredöme mera och ware ecke then stora bygninge met thenne mwren jak haffuer for hender."..."sta swara penninghe for en han komber op; thet är vel viidh xxij fampna, om niidh är fallit; ch haffuer jak lathet renseht alth op aff grwnnen och lather jak holla fast oppo och mwre, sa mik hoppis til God, han skal brot komma op j en god matth." Vf. Gardberg 1959, pp. 46-47. Ahrenberg had a slightly different idea. According to him the collapsed wall was not torn down until 1507 and permission was sought for its reconstruction (Ahrenberg 1901, p. 55).

[9] The lime mortar used in medieval masonry work could harden only during the warm summer months (E.g. Hiekkanen 1994a, pp. 249-249). The masonry work on the whole south section (ca. 40 metres of wall and one tower) was so large a project that it could not have been carried out during the month of May alone.

[10] Gardberg 1959, p. 33, 72-74.

remains of a large gate structure. It is naturally possible that in 1549 the five master bricklayers hired for the work walled up the gate so well that it has not been detected even after decades of investigations.[1] Gardberg has verbally suggested the further possibility[2] that the gate was near the top of the grey stone wall, which would have placed it at least 5-6 metres above ground level and would have required a wooden bridge structure of some kind. At least no distinct traces of a bridge of this kind have been found. Excavations in the area fronting the wall have been limited in area.

I would suggest the possibility that the southeast tower that preceded the present round tower was connected to a gateway of brickwork of which remains were revealed in excavations extending beneath the round tower in the late 1950s.[3] The southeast tower was clearly linked to some kind of opening through the wall, which was filled before the late 16th century. Accordingly, the present hexagonal tower would have been preceded by the south tower of the outer bailey and the southeast tower by the gate tower. Moreover, the former north tower stood in the northeast part (Fig. 51).

A third interpretation is found in Aki Pihlman's suggestion that the oldest route of communication between the castle and the town passed by the northeast tower.[4] There are no distinct remains of a gateway structure in the area of the northeast tower, but it is possible that they remained behind the northeast tower, which was repaired in the 16th century. Accordingly, it can be suggested that the present hexagonal tower was also originally the south tower, the north tower was beneath the round tower and the northeast tower was the gate tower. This interpretation suggests that the north and south towers were not located according to the geographic north-south axis, but we must bear in mind that in the oldest sources the west tower is known as the south tower and the east tower is called the north tower[5]. It can therefore be suggested that the same north-south axis running parallel to the Aurajoki River originally extended to the outer bailey.

A further problem concerns the original names of the baileys or wards. It is clear that during the 16th century the "new castle" (*nya slottet*) mentioned by Ahrenberg emerged, in which connection the southern outer baileys/wards took on a clearly secondary role.[6] We can ask, however, whether the eastern outer bailey essentially differed from the corresponding southern structures. In 1994 I suggested the alternative that the oldest reference to the outer bailey concerned the outer structure on the south and southeast side of the main part of the castle[7], but subsequent scientifically obtained dates suggest that the whole eastern outer bailey had already been completed for a long time by 1463.

5.6. The Stages and Dating of the Construction of the Outer Bailey at Turku Castle

C.J. Gardberg's studies outline the stages of construction of the outer bailey of Turku Castle. The purpose of the present study is to investigate the earlier medieval history of construction. In my article on the subject in 1994, I had to leave this question open, because the available result were still highly conflicting.[8]

The building of outer bailey structures outside the walls of the main part of Turku Castle began in the 1380s, when work began on the southern and eastern parts of the outer bailey. In addition to a wall of unworked stone built on a very carefully constructed log foundation, the outer bailey included already at that stage three towers of stone or brick. The oldest stage of the outer bailey also included a gate, or gates, of which the only definite archaeological observation is from the location next to the southeast

[1] Gardberg 1959, pp. 72-73, 150-151.
It is very rare for a gateway to be walled up so well that it cannot be detected in later investigations. Joints of some kind will always remain in the fabric and the differences of material can be observed.

[2] Personal comment by Carl Jacob Gardberg at a seminar on Turku Castle in November 1992, held in Turku Castle.

[3] With regard to the gateways in the outer bailey, we must note that several gates were in use, perhaps at the same time or in consecutive order. The outer baileys of Kuusisto, with several gateways of different date, are an example of this.

[4] Pihlman 1994, p. 76. The first maps showing the connections between Turku Castle and the town itself are from as late as the 17th century. The oldest map (dated ca. 1600) in the Swedish War Records Office shows that the road from Turku passed directly from the east towards the moat of the castle (following the course of present-day Linnankatu street), but the bridge crossing the moat is situated to the southeast of the outer bailey, in line with the gateway on the walls. (KrA, Åbo nr. 2). The same discrepancy between the course of the road and the gateways in the walls can also be seen in a map drawn up by Olof Gangius in the 1630s. (e.g. Kostet 1995, pp. 39-40). It was not until the 17th century (the oldest map is from 1656) that a road led directly towards the gateway of the eastern outer bailey (KrA. Åbo nr 3).

[5] E.g. Snellman 1891, pp. 9-10; Gardberg 1959, pp. 31-32, note 52a. A source from 1542 clearly refers to the west tower of the main part of the castle as the south tower, "haffua brutt Södre torn på Slått:t" (Gardberg 1959, p. 102). Later in the 16th century the present east tower of the main part came to be called the north tower (e.g. Snellman 1891, pp. 12-13, 17).

[6] Gardberg 1959, p. 33.

[7] Uotila 1994a, pp. 60-69.

[8] Uotila 1994a, pp. 60-69.

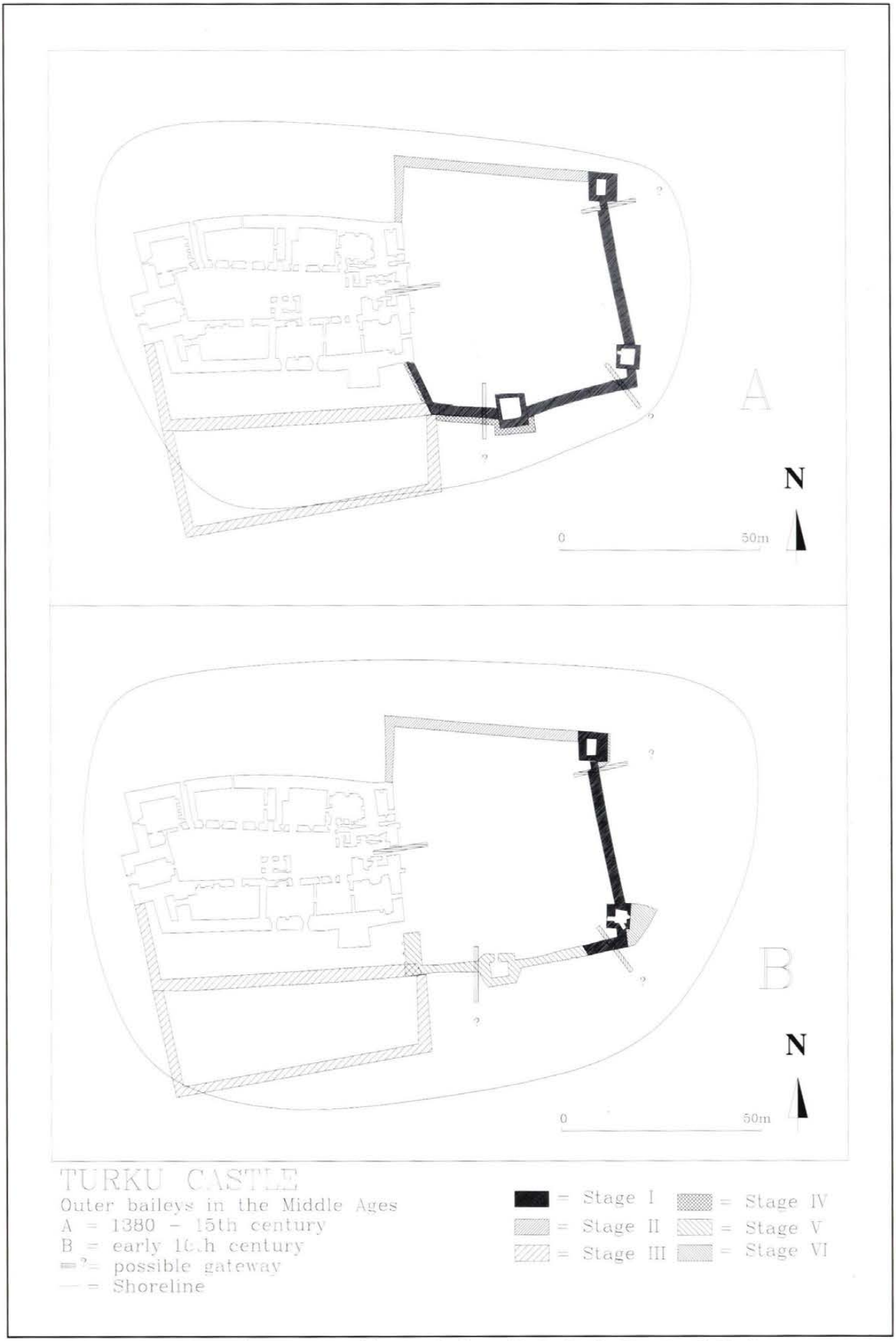

Fig 51. The medieval history of construction of the outer baileys of Turku Castle. (Drawing K. Uotila)

tower. Construction ceased for some twenty years at the northeast tower in the north part of the outer bailey. Dendrochronological dates show that building work was not resumed until after 1400 with the addition of the north and northwest walls of stone, which were built completely without towers. The original plan probably already included the upper southern ward, which also dates from the turn of the 14th and 15th centuries. The lower southern ward was built during the 15th century prior to the repairs undertaken in 1505-1507 (Fig. 51).

In the next stage, forces of nature and the fact that the clay foundation gave way steered the development of the eastern outer bailey. A possible rise in water level in the eastern outer bailey area had the result that the old sea-bed clay that had already hardened before the construction work became wet again and the old masonry structures sank as much as three or four metres into the clay, or leaned up to 14-15 degrees towards the Aurajoki River before collapsing. Historical sources tell that in 1505, the southern part of the eastern outer bailey collapsed. As a whole, the sinking of the outer bailey structures may have occurred over a longer period until the turn of the 15th and 16th centuries. In the southern outer bailey structures the rise in water level affected at least the lower southern ward and possible the upper one as well (Fig. 51).

The collapse of the old walls called for quick repairs, which were already undertaken in 1505-1507. At this stage, the southern part of the eastern outer bailey was completely realigned and the present hexagonal south tower was constructed at the site of the old four-sided tower.[1] There is no definite indication of the total extent of the repairs in area of the southeast and northeast towers, but it is clear their use was greatly impeded by the marked sinking of the structures and that foundation works and repairs of some kind were definitely carried out.

The next stage is known in detail from historical sources. In the 1560s the medieval stone walls and tower were raised with the addition of a brick part averaging 5-6 metres in height. In addition to the walls all three towers of the outer bailey were apparently repaired or raised at this stage. The 1570s signalled the beginning of a rapid construction stage. By the 1590s the whole eastern outer bailey had been given its 16th-century appearance and the medieval components had either been covered by later structures or torn down.[2]

There are no actual sources on the later stages of the southern wards. It can be suggested, however, that the walls of the upper outer ward (the smithy ward) were raised in the 1560s at the same time as the walls of the eastern outer bailey. Written sources from 1563 contain the mention: "*på enn rinngh mur som opmureds*"[3]. It is possible that the encircling wall referred to her implied only the eastern outer bailey, as assumed by Gardberg.[4] The oldest surviving paintings (Fig. 9, 43 and 44), however, suggest that the southern wall (smithy ward) was almost the same height as the eastern outer bailey.[5] It is therefore possible that the sources of the 1560s are also associated with raising the height of the walls of the smithy ward.

[1] Gardberg 1959, pp. 46-49.
[2] Gardberg 1959, pp. 148-153, 303-306, 386-388, 427-487.
[3] Gardberg 1959, p. 312.
[4] Gardberg 1959, pp. 312-315.
[5] E.g. an oil painting by Thomas Legler from the 1830s (TMM 4070). See Gardberg 1959, p. 16, 18 and 24.

6. KUUSISTO CASTLE

Finland's only medieval episcopal castle is situated at Kuusisto, approximately 15 kilometres from Turku Castle and the city and cathedral of Turku. (Fig. 52) In sparsely settled medieval Finland this close proximity of two castles was exceptional[1]. The Aurajoki River catchment and the province of Finland Proper were, however, the core areas of medieval Finland, where the country's secular and ecclesiastical authorities were concentrated. The known history of the castle began at the end of the 13th century[2] and ended in an official order for its demolition in 1528.[3]

Research concerning Kuusisto Castle is of crucial importance for obtaining a general picture of the history of medieval castles in Finland. King Gustavus Vasa's demolition order was followed without delay.[4] One can claim with good cause that the castle's medieval architectural history truly ended in the late 1520s.[5] Accordingly, Kuusisto never underwent the kind of construction that was carried out, for example, at Turku Castle during the 16th century overlaying all the medieval walls and towers of the eastern outer bailey. The walls and towers of Kuusisto Castle are an example of the construction of outer bailey structures in Finland during the Middle Ages.

6.1. History of Research

The location of the episcopal castle of Kuusisto survived in popular memory throughout the centuries, for the site was marked in maps drawn until the 16th and 17th centuries.[6]

During the 18th and 19th centuries stories were written about the history of the castle and at least a few painters visited the site. At the time, the castle ruins were a romantic background for paintings, but actual research and investigations followed only at a later stage.[7]

During the 1870s interest in the history of Kuusisto entered into a new stage when excavations were begun in 1877 under the direction of Reinhold Hausen. Hausen's superior, State Archivist K.A. Bomansson was apparently instrumental in the project. The purpose of the excavation was to find even small parts of the foundation structures, and accordingly the revealing of the whole ground floor was a great surprise for the leaders of the investigation. In addition to the main part of the castle, parts of the outer baileys were already excavated at that stage. Excavations were continued in 1870, but funds ran out and the obviously incomplete field work had to end.[8] Hausen published the historical and archaeological studies on the castle in a two-volume academic dissertation in the 1880s, after which he no longer returned to the history of the castle.

Reinhold Hausen's archival research and field work resulted in the view that the building of the castle had already begun at the turn of the 13th and 14th centuries with the construction of the main part in stone, which was enlarged during the 15th and 16th centuries.[9]

The castle, which had been in quite good condition when first excavated by Hausen, had fallen into disrepair. Large parts of the medieval brick structures had collapsed or had weathered severely. One reason for this may have been Hausen's lack of concern for protective measures, as was suggested at the time.[10] A further possibility is that the funding that was denied in 1879 was also intended for

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[1] On the location of Kuusisto Castle, see e.g. Jaakkola 1958, pp. 420-421.

[2] 7.11.1295 Kuusisto (FMU 219, REA 17. Finnish translation by Linna 1989, p. 111, no. 117) See Hausen 1881, pp. 12-13. (During the term of this Ragvald, Kuusisto Castle was built in the Year of Our Lord 1317; Juusten 1988, p. 42.). See Hausen 1881, pp. 12-14.
According to Russian chronicles, the Novgorodians at Pentecost in 1318 destroyed the town of Turku and the bishop's residence (Kuusisto) (Hausen 1881, p 19, note 20). The destruction of Kuusisto Manor, "curia episcopi Kustu" was still referred to as late as 1331 (FMU 387). See Hausen 1881, pp. 14-15.

[3] E.g. Hausen 1881, pp. 36-37.

[4] The quick destruction of Kuusisto Castle could have resulted solely from quickly following the orders of the new king, but there may also have been in the background a situation of accumulated popular resentment towards the Catholic Church and the bishop's residence.
On the crisis of the church in general, see Kirby 1994, pp. 97-100; Heininen & Heikkilä 1996, p. 60.
On the relations of Kuusisto Castle with its near environment, see e.g. Uotila 1995, pp. 50-51.

[5] Coin finds from Kuusisto do not include a single Swedish coin from the period 1530-1630. The ending of the hitherto rich coin material precisely around 1528 shows that the use of the castle area ended soon after the demolition order was given.
E.g. Taavitsainen 1980, pp. 37-42; Sarvas 1993 & 1996.

[6] Kuusisto is marked in Olaus Magnus's map from 1539, with a tower denoting a castle under the name (e.g. Ehrensvärd 1995, p. 93 and fig. 12).

[7] E.g. Hausen 1883, p. 46; Gardberg 1993a, pp. 122-129; Kostet 1985, pp. 87-98; Suna 1994a, pp. 6-9.

[8] VA, Archives of Reinhold Hausen, letters from K.A. Bomansson, 1877 and 1879. On the earliest research history of Kuusisto, see e.g. Gardberg 1993a, p. 123.

[9] Hausen 1883, pp. 47-71.

[10] Miettinen & Suna 1991; Mentu 1994, p. 40.

Fig. 52. Kuusisto Castle (Sw. Kustö)
The episcopal manor and residence of Kuusisto is mentioned in sources for the first time in 1295, and in 1318 it was destroyed by the Novgorodians. Early 14th-century bishops issued a large number of letters concerning their manor (curia) and the term castrum is first used in the early 15th century. In the 1480s there was a major fire at Kuusisto, after which the castle was refurbished. In 1521, Bishop Arvid Kurki, the last resident, fled from the Danes, and in 1523 Kuusisto was taken by Swedish troops. In 1528 King Gustavus Vasa ordered Kuusisto to be torn down, and the site soon began to fall into ruins. Excavations at Kuusisto commenced in 1877. View from the southeast. (Photo P.O. Welin)

protecting the castle structures, as had been the case at the convent of Naantali, where Hausen had excavated in the 1870s.[1] At any rate, investigations of the castle, which was in poor condition, remained few, and the repairs and excavations directed by architects did not produce any written documents for posterity.[2]

Hausen's dissertation on the castle appeared in an abridged Finnish translation in 1904 in Juhani Rinne's guide book on the castle. In addition to Hausen's data, Rinne clearly had observations of his own of the various components of the castle.[3] It is possible that Rinne also worked at the castle after the publication of the booklet, as there are a few measurements of bricks by him from 1905.[4]

Minor repairs were made to Kuusisto Castle particularly in the 1930s, but they did not involve trained research personnel. In 1952 Carl Jacob Gardberg published a guide book to the castle and its history in Finnish and Swedish. In later years, Gardberg has discussed the earliest stages of Kuusisto in an article and has written chapters on the castle for several general works.[5]

At the turn of the 1950s and '60s repairs and field work were carried out at Kuusisto. The most extensive work concerned the encircling wall and round tower of outer bailey I. The work was conducted by Aarne Heimala and Olavi Tapio. According to surviving sketches, Heimala had new ideas about the history of the castle, but he never presented these in either scholarly or popular form. The results and interesting interpretations remained in the archives. We must note, however, that building-archaeological observations and data of the 1990s are in good agreement with Heimala's views.[6]

The archaeological material from various parts of Kuusisto Castle was first studied in the 1970s — an obvious first also for all castles in Finland. The purpose of Jussi-Pekka Taavitsainen's studies was to investigate materials excavated at Kuusisto over the years and to establish the age of the castle from this material. His studies clearly altered the traditionally held picture of a castle built in the 14th century, for the archaeological material suggested that it had not been built until the 15th century.[7] In the 1970s Taavitsainen mostly had at his disposal material from the demolished layers of the castle, and there were hardly any areas that had been archaeologically excavated down the bottom layers.

A new stage of repairs and investigations began at Kuusisto in 1985, and will probably continue until 2000.[8] At first the research was directed by Lasse Laaksonen on behalf of the National Board of Antiquities and from 1989 by Antti Suna. Relying on the research tradition of Hausen, Rinne and Gardberg, an exhibition on the history of the castle was prepared at Kuusisto Manor, extensively presenting excavation finds and the stages of construction.[9]

During the 1990s, the material and data from Kuusisto has come to be studied with various methods. One of the first indications of a new stage in studies is a 1994 collection of articles on Kuusisto Castle published by the NBA and presenting the history of the castle from the perspective of both archaeologists and experts in the natural sciences.[10] Kuusisto Castle is also the subject of t graduate theses, and a few articles on the castle have appeared in 1994-1996.[11]

In the 1990s, the history of Kuusisto Castle has been discussed in a number of other studies, including Christian Lovén's major work on the castles of the whole medieval realm of Sweden. Lovén's work contains an extensive section on Kuusisto. According to Lovén, his interpretations concerning Kuusisto are mostly based on the present

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[1] On research and investigations of the convent of Naantali, see e.g. Hausen 1922, pp. 5-7; Hiekkanen 1988, pp. 50-52.

[2] Archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle. Documents of repairs and correspondence, 1890s. See Miettinen & Suna 1991, Mentu 1994. The actual standards of late-19th-century investigations may have been good, as for example Jac. Ahrenberg clearly had new information about the castle structures. He touches upon this data in his study on Turku Castle. E.g. Ahrenberg 1901, p. 21. Moreover, M. Schjerfbeck has prepared reconstructions of Kuusisto Castle with numerous actual structural observations, even though the configuration of the upper parts is solely his own invention. (Illustrations: Archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle. The illustrations are on display at the NBA exhibition at Kuusisto Manor. See also Suvanto 1985, p. 181).

[3] Rinne 1904, pp. 42-

[4] Rinne 1904 and Archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.

[5] Gardberg 1952; Gardberg 1978 and e.g. Gardberg 1993a, pp. 122-129 and Gardberg 1993b, pp. 232-236.
Basing on Gardberg's results, Kuusisto has been discussed as one of the main episcopal castles of the whole Swedish realm. (Lovén 1989, pp. 33-46).

[6] Heimala & Tapio 1958-1962.

[7] Taavitsainen 1980.

[8] Field work in 1985-96: Suna & Kykyri 1985-1988; Suna & Venhe 1989-1996; Korolainen & Sjölund 1987-1989; Uotila 1990-1997. See Suna 1994c.

[9] NBA exhibition on Kuusisto Castle on display at Kuusisto Manor. Prepared by Suna et al.

[10] Suna 1994 (ed.)

[11] E.g. Alopaeus 1996, pp 9-12; Suna 1994c, pp. 29-32; Uotila 1995, pp. 37-52. Other studies include Leena Venhe's research on the bricks of the castle (Venhe 1994, pp. 32-39) and Jan-Erik Wahlberg's study on the geological history of the castle area (see Wahlberg 1994, pp. 66-78).

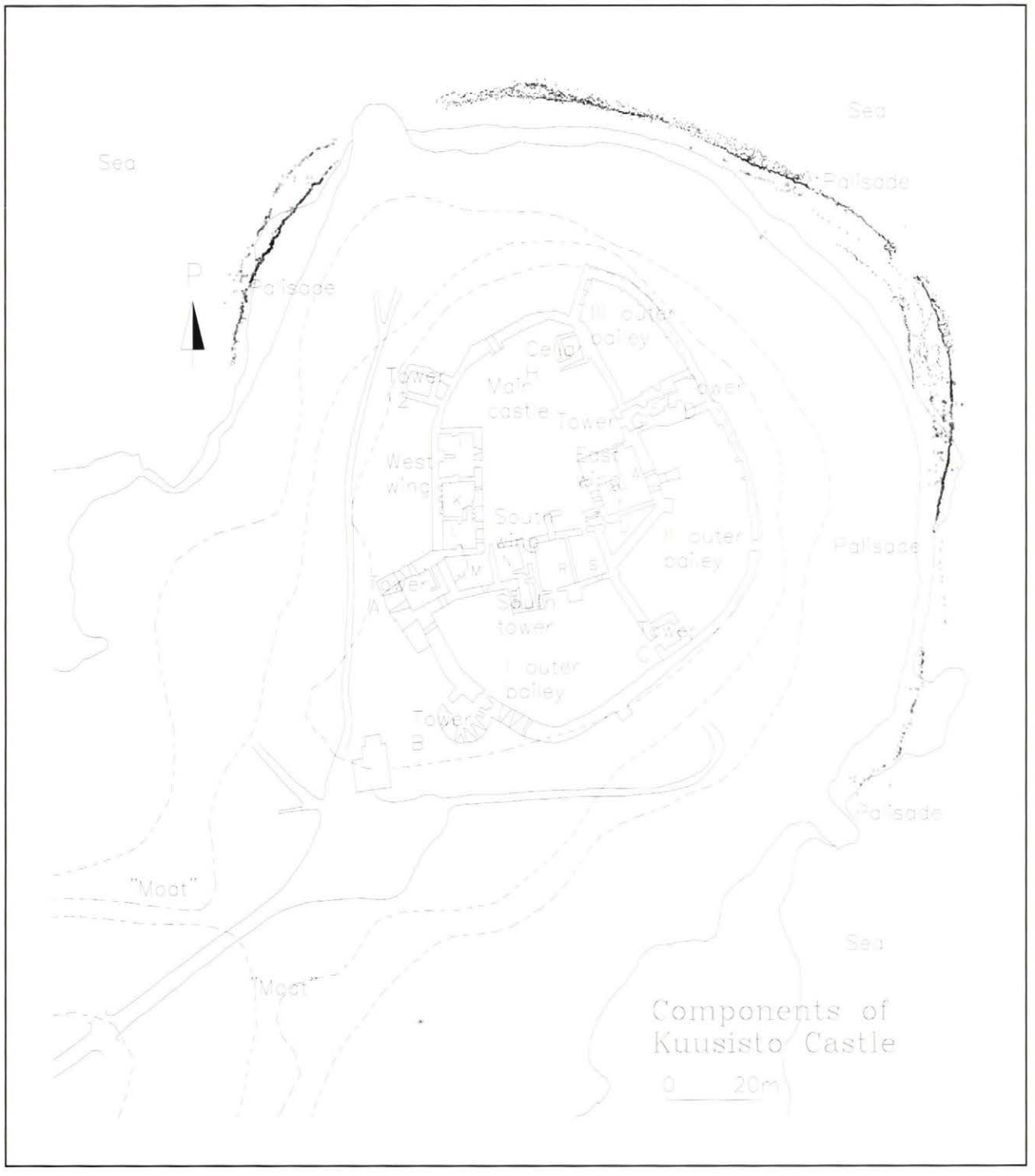

Fig 53. The various components of Kuusisto Castle. (Data from the archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle. Illustration revised by K. Uotila)

author's tentative results, but the text also contains some of Lovén's own interpretations. [1]

6.2. The Research Material

Archaeological research has been conducted at Kuusisto Castle since the 1870s, but the oldest surviving — or filed — excavation reports and other records are from as late as the turn of the 1950s and 1960s. At that stage work was mainly conducted in outer baileys I and II and in sections of the main part, but in many locations repairs were not completed.

The ongoing repair and research project that began in 1985 has resulted in repairs to large parts of the castle walls. With only a few exceptions, the wall structures found in this connection have been

[1] Lovén 1996 pp. 264-266.

reported, but the material has not been studied in further detail.[1]

Archaeological excavations have been carried out at Kuusisto since 1985, first outside the castle walls and from 1989 within the actual castle area. The most extensive and archaeologically most important work has been carried out in the area of outer bailey II, in addition to minor trial excavation in various parts of the castle. The selection of excavation sites has primarily been dictated by the needs of repair work and not by scholarly or scientific problems[2]. The courtyard of the main part, which is of prime importance for the history of the castle is still almost completely unexcavated, wherefore interpretations of the early stages of the castle still lack a solid foundation.[3] The study and interpretation of the archaeological data suffer from the general trait of medieval archaeology in that excavation reports are still lacking in places.

6.3. The Episcopal Castle of Kuusisto and its Environs in the Middle Ages

Kuusisto Castle, located at the head of a small cape in the east end of the island of Kuusisto, has traditionally been divided into four parts (a more detailed description of rooms is given in the map in Fig. 53).[4] At the highest elevation on a small hill at the site is the main part. To the south and southwest of the main part is outer bailey I and outer bailey II is to the southeast. Outer bailey III is to the northeast. Tower group 12, a large structure, is situated on northwest side of the main part. The most distinct structure outside the castle is a palisade in shallow water by the shore, which has been revealed on the west, north and east sides of the castle. It possibly encircled the whole castle. A moat is assumed to have been located at the point where the cape joins the body of Kuusisto Island, but there are no distinct structures or soil layers pointing to this (Fig. 53) .[5]

On the island side, some 500 metres from the castle, is a large manor area (Kuusisto Manor, also known as *Everstin virkatalo* [The Colonel's Residence]), where the existing buildings date from the 18th century and the surrounding parts from the 19th and 20th centuries. It has been suggested in the research literature that the first episcopal residence or manor at Kuusisto was at the site of the present-day manor and that the cape with the castle was not occupied until the 15th century. The only distinctly older building in the area is a small vaulted cellar beneath a storeroom in the manor courtyard. The structural details of the cellar suggest possible construction in the Middle Ages or the 16th century. The manor area has not undergone any archaeological investigations, but visual inspection alone reveals several foundations of buildings and structures in the terrain. There are also the possible remains of a medieval cemetery and chapel on a high hill near the manor, which is known as *Kappelinmäki* [Chapel Hill]. There may also have been a small hamlet in the present area of fields between Kappelinmäki and the castle cape. It could have been a settlement or trading site adjacent to the castle. Also this area remains to be excavated (Fig. 52).[6]

In summary, it can be noted that there was a large area of household and economic activities at Kuusisto Castle and in its environs. The area also displays a three-part division typical of medieval castles. The castellan resides in the main castle, the outer bailey serves as a defensive and dwelling structure and a further area or bailey serving household and economic needs is found at some distance from the castle. The latter was the site for the maintenance of the castle. At Kuusisto this complex included a possible cemetery on the nearby hill. In addition the medieval bishop's household included the whole island of Kuusisto, with 12 villages or hamlets and several farms in nearby Piikkiö.

The most interesting of these with regard to the castle's history of construction is a small hillock located exactly opposite the castle which was the site of an episcopal property known as "*Tiilisali*" [Brick Hall] in the Middle Ages. [7]

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[1] Korolainen & Sjölund 1987-1989; Suna & Kykyri 1985-1988; Suna & Venhe 1989-1996; ; Uotila 1990-1997.

[2] E.g. Suna 1994c, pp. 29-38.

[3] E.g. Gardberg 1993a, pp. 128-129 and Suna 1994c, p. 37.

[4] Gardberg 1952; Hausen 1883; Rinne 190

[5] The numbering of the components of the castle has largely remained unchanged since Hausen's studies (1883). The moat has been given a location between the main island of Kuusisto and the cape (e.g. Gardberg 1993a, p. 123; Hausen 1883, p. 49; Lovén 1989, p. 41).

[6] E.g. Taavitsainen 1980, p. 15; cf. Gardberg 1993a, p. 123; Suna 1994, p. 8. On the Kappelinmäki cemetery, see Rinne 1912.

[7] Läntinen 1978, pp. 118-124; Havia & Luoto 1989. On the relationship of Kuusisto and the bishop's *mensa*, see also Uotila 1995, pp. 48-51.

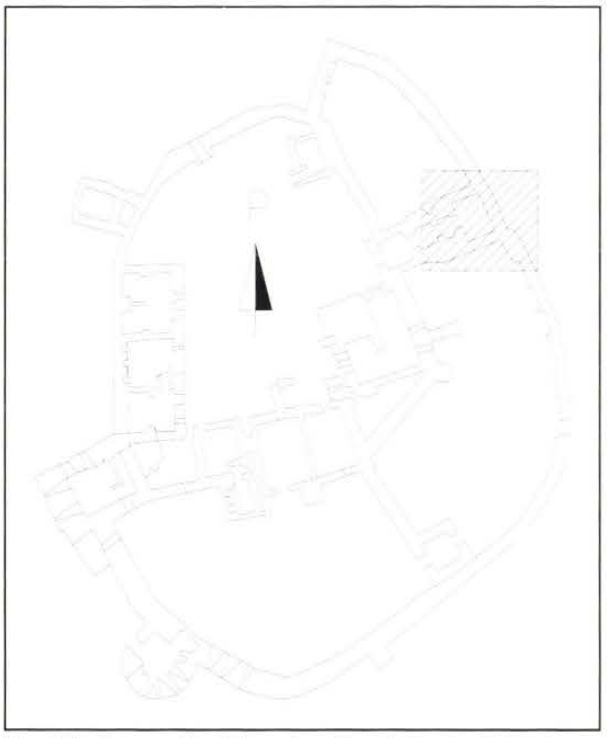

Fig. 54. Tower D of Kuusisto Castle

6.4. The History of Construction of Kuusisto Castle

Basing on the excavations of 1877 and 1879, Reinhold Hausen had a relatively clear idea of the history of the castle, and in later years Rinne and Gardberg have concurred with him. According to them, the oldest reference to Kuusisto in sources possibly concerns a wooden residence that was destroyed when the Novgorodians attacked in 1318. The oldest part of the stone-built castle is the southern dwelling wings (palatial part) of the main part, and the wall surrounding the main part, which date from the 14th century. In the early 15th century under Bishop Magnus II Tavast ("circa 1431 "), east and west wings and the eastern outer baileys II and III were added to the main part. At the end of the 15th century, the main part was raised in height and the surrounding wall of outer bailey I and the round artillery tower (B) were built.[1]

Investigations of the wall structures of the main part in 1990-1996[2] show that the three-room structure of the west wing existed prior to the construction of the south wing. Moreover, excavations of a small room (room T) show that the square building of the east wing was clearly built before the wall structures of the palace in the south wing. Excavations of room U revealed that the bearing east wall of the southern palatial section had been laid directly on earlier cultural layers containing objects dated to the 15th century.

The building-archaeological data suggest that the oldest part of the main section (first half of the 14th century) is the originally single-storey three-roomed masonry structure of the west wing. The wall surrounding the main part possibly dating to the same stage was built adjacent to the above stone house. The same concerns tower G on the east side of the courtyard.[3] The tower may have been the castle's oldest gate tower facing the harbour. In the next stage in the 14th century, a low stone building was constructed in the east wing. It was not until the third stage (possibly under Bishop Magnus II Tavast in the early 15th century) that the southern palatial section was built. Later in the 15th century — possibly after the fire of 1485[4] — the stone structures of the south, east and west wings were raised to two- or three-storey height and their interiors were fitted with vaults (Figs. 72 and 73).[5]

6.5. The Construction of the Outer Baileys of Kuusisto Castle

The main problem in investigating the building of the outer baileys at Kuusisto results from the fact that field work is still in progress in many places and will probably continue until the year 2000. It is thus obvious that new information and dates will be available each season for the various components of the baileys, which will naturally change the existing picture.

6.5.1. Tower D

Tower D, located at the junction of outer baileys II and III is, according to my present views, the oldest tower in the outer bailey that can be associated with the defence of the oldest gate tower, facing east. No detailed investigations have yet been carried out, but the visible joints of the walls suggest that the tower

[1] E.g. Gardberg 1952, pp. 29-30; Gardberg 1993, pp. 122-129; Hausen 1883, pp. 49-71; Rinne 1904, pp. 20-41.
[2] Uotila 1990-1997.

[3] Structures of cellar H in the northeast corner of the main section were investigated in 1996. It was observed that the present north wall mostly resulted from repairs and that the older wall had been located 80-100 cm inward. This implies that cellar H is not the older part of the encircling wall of the main section, as could be assumed from the visible structures (Uotila 1990-1997; Uotila 1994b, p. 26; See also Lovén 1996, p. 264).
[4] On the fire of Kuusisto Castle, see e.g. Gardberg 1952, p. 8; Hausen 1881, p. 21; Rinne 1904, p. 36.
[5] Uotila 1994b, pp. 26-30 and Uotila 1995, pp. 43-46. See also Palola 1997, pp. 172-175.

Fig. 55. The south wall of outer bailey III of Kuusisto Castle in the early 20th century (view from the north). At the right is the east outer wall of the main castle and tower G, of stone, attached to it. In the middle of this component is a section in brick consisting of rooms E and F, which is the youngest component of the whole group of structures. At ground level in the middle of the brick section, which may be associated with one of the privies of the castle. In the left part is tower D, also of stone, with the outer wall of outer bailey III adjacent to it. (Photo from the archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

was built before the small tower group E and F on the west side and also before the walls surrounding outer baileys II and III. There is, however, a massive boulder-like binding stone in the outer wall of the northeast corner of tower D. In the present configuration, the stone extends into the wall of outer bailey III, which suggests that the wall of the latter was already planned when tower D was under construction. The same is suggested by the fact that beneath tower D and the wall of outer bailey III is a stone foundation (an unmortared socle) extending beyond the actual wall structure at the wall of outer bailey III by ca. 0.5-1 metres and at the foot of tower D by 1-1.5 metres (Fig. 55, Plates XXX, XXXI).[1]

There is a distinct structural difference with the wall surrounding outer bailey II, for its wall is joined to the outer exterior wall of tower D. The original brickwork of the wall is in a joint with the south wall of tower D, which means that tower D must have been in place when the wall came under construction.[2]

6.5.2. The walls of outer bailey III

Visible in the surviving wall section at the northwest end of the wall of outer bailey III are two large wall niches with brick relieving arches. Their present appearance does not reveal their original construction; the angles and shape of the arches are clearly the result of repairs carried out in the 19th and 20th centuries.[3] It is possible that the arches were revealed in excavation and preserved in the repairs carried out in the early years of the 20th

[1] Uotila 1990-1997.

[2] Uotila 1990-1997.

[3] Uotila 1990-1997.

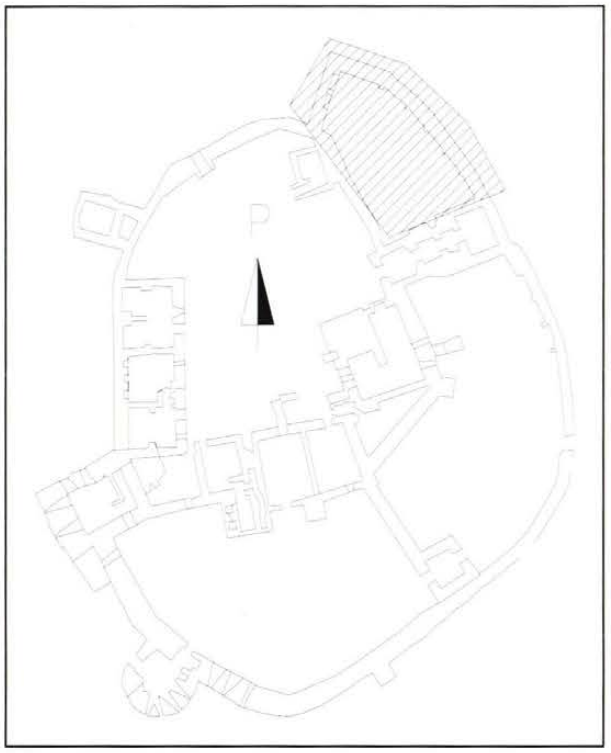

Fig. 56. The walls of outer bailey III in Kuusisto Castle

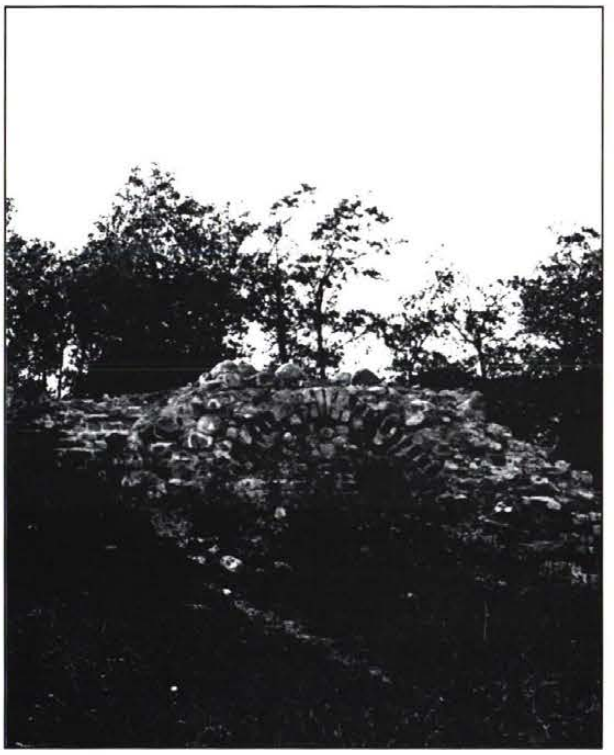

Fig. 57. The northwest section of outer bailey III of Kuusisto Castle in the early 20th century (view from the southeast).
On the middle is the northwest wall of outer bailey III, with a distinct brick arch structure visible in the damaged wall. This picture is the only one in which the medieval brick-arched niche is still visible, for it was faced with a new brick arch in repairs carried out in the early 20th century. (Photo from the archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

century. No measured drawings, if any were prepared, survive from that time (Figs. 56 and 57).

In 1991, however, confirmation was obtained for the existence of the wall arches, when part of the collapsed surface of the east wall was removed, revealing ca. 50 cm within the wall structure an older brick construction, including in preserved form the foundation of the brick arches, part of the arch in places and the rear wall of a structure in Flemish bond.[1] The walling up suggested that considerable alterations were made to the walls during the Middle Ages, such as their raising in height .[2]

During the investigations carried out in 1996 the junction of the northwest wall and the northeast wall of the main castle was revealed. Beneath the filling brickwork was a brick-lined opening less than a metre wide and extending through the wall. It was observed that the opening was part of the original brick-arch wall. Like the arches it was already walled up while the castle was in use.[3] The small postern did not have any gate structures and the location of the opening above a steep rock face might suggest a small gateway for maintenance purposes - some kind of sallyport.

Belonging to the same state as the repairs of the wall is a small gateway opening discovered in the middle of the east wall, whose structures partly overlaid the brick arches. There is no related interior supporting structure or brickwork, which means that the structure was not a gate tower. It is a smallopening through the wall, originally situated 2-3 metres above the ground level of the time. Excavations were conducted in the 1980s near the gate, but they did not reveal any external gate structure.[4]

[1] A detailed illustration of the construction is found e.g. in Venhe 1994, p. 34.

[2] On the filling and walling up of large wall recesses and the raising of walls in works on the town wall of Tallinn, see Zobel 1980, p. 119.

[3] Uotila 1990-1997.

[4] Suna & Kykyri 1985-1988 and Uotila 1990-1997.

6.5.3. Outer bailey II

The best preserved feature of outer bailey II is the wall connecting it to outer bailey I, with two surviving large brickwork supporting arches in the lower part. Their original structure can still be seen behind the bricks used for repairs, and they appear to be lower than the arches in outer bailey III. The upper part of the connecting wall was repaired in 1995, and the wall revealed in places the remains of a brickwork construction possibly associated with a bridge leading to tower C (Fig. 58).[1]

The southeast and east walls of outer bailey II are under layers of preserved masonry. Behind it excavations in the 1990s revealed the remains of a brick arch construction, which means that a wall structure similar to the connecting wall and outer bailey III extended to this part of the wall (Fig. 57). In the past the walls were repaired more than in outer bailey III, but there are also signs that also in these walls the supporting arch structure was already covered in the Middle Ages with a wall of masonry (Plate XXXII).

A further distinctive feature of this section of the wall is that it leans towards the east and the southeast. The north part of the wall, near tower D, was built on sand or moraine, but the east and south parts are on clayey soil. The latter parts already sank during the Middle Ages. The wall has two distinct cracks indicating movement. One of these is in the east part and the other is in the south part near tower C. In the south part there is a crack roughly 20-30 cm wide in the wall, and the leaning wall has clearly separated from the rest of the structure. The wall leans towards the south by almost 20 degrees. A supporting structure of brickwork was built in front of the wall already in the Middle Ages.[2]

In the middle of the wall is a gateway, with a few courses of brick still remaining at the sides. These are clearly inclined towards the southeast. This gateway apparently belonged to the original wall, and it too had sunk along with the older section of the wall.

According to earlier studies, the gate included a tower structure, but there are no indications of one.[3] The gateway area was excavated in the 1980s, but at that stage at least the exterior structures were observed to be secondary piles of fill. On the inside are a few large foundation stones, but no actual tower has been discovered.[4]

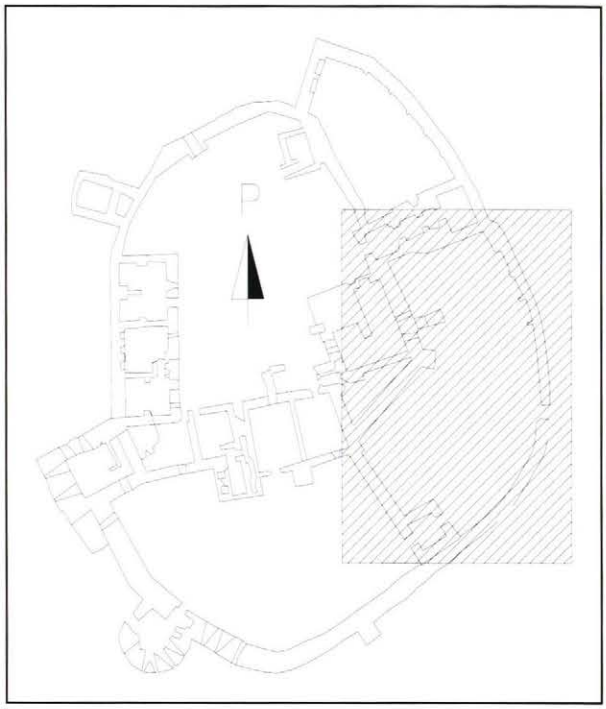

Fig. 58. Outer bailey II of Kuusisto Castle

Outside the wall, the gateway was linked to a large paved area extending far to the shore. The pavement has been interpreted as having been associated with the pier structures of the castle.[5]

According to Juhani Rinne, outer bailey II was originally narrower than at present. He claims that a low stone setting belonged to the remains of the wall.[6] Excavations in the 1980s and '90s, however, revealed that there was only a stone pavement of the ward in the location where Rinne claimed a wall existed.[7]

There are several remains of buildings in the yard or ward of outer bailey II. Excavations in the 1960s revealed the remains of a small brick building near the wall and in the 1980s the remains of wooden building were found in the middle of the north part of the yard. Since the beginning of the 1900s, a three-room building has been marked in maps and plans of the west part of the courtyard (rooms 22-24).

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[1] Uotila 199

[2] Uotila 1990-1997

[3] E.g. Hausen 1883, p. 52; Rinne 1904, p. 8

[4] Suna & Kykyri 1985-1988.

[5] Suna & Kykyri 1985-1988; Suna & Venhe 1989-1976; Suna 1994b, p. 15.

[6] Rinne 1904, pp. 8-10; cf. Gardberg 1952, p. 15 in which the author notes that the wall was relocated already during the construction work. In his own study, Hausen makes no mention of any wall passing through the outer bailey (Hausen 1883, pp. 52-53 and maps).

[7] Suna & Kykyri 1985-1988; Suna 1994b, pp. 14-15. See also Lovén 1996, pp. 265-266.

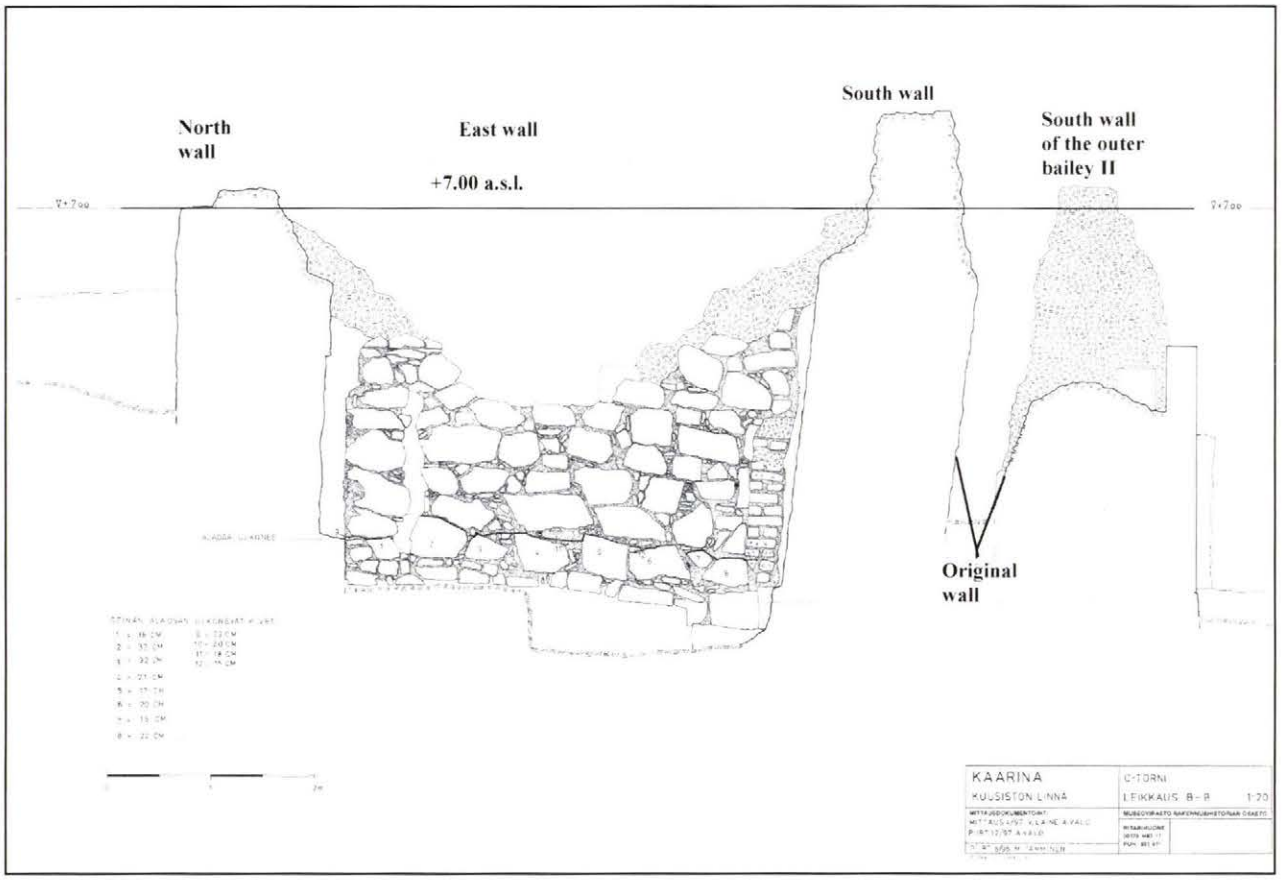

Fig. 59. The east wall of tower C of Kuusisto Castle (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.).

The excavation of this structure was begun in the summer of 1997. The field work revealed that although not all the partition walls could be found, the structure was clearly a large masonry building.[1]

6.5.4. Tower C

During 1995-1997 the main field work at Kuusisto concentrated on tower C. It had been assumed previously that this tower had originally been a gateway tower between outer baileys I and II [2], but excavations have only revealed a tower doorway opening onto outer bailey I (Fig. 60).[3]

Another structure that was revealed was the brick north wall of tower C, whose lower part, of masonry, contained indications that the wall connecting outer baileys I and II and the structures of tower C are linked by a few large binding stones. Higher up in the tower, the north wall was made of brick and the unbroken brick wall and masonry joints clearly show that at this stage the tower was a freely standing structure.[4]

A similar structural joint can be seen in the section south of tower C, where the south walls of outer baileys I and II were built to adjoin tower C. At present, there is a 20 to 40-cm gap between the tower and walls, but this had only come about later as a result of the shifting of the walls (Fig. 58).[5]

The structures of the tower and the earth layers show that the tower was built, or at least repaired, in several stages. On the ground floor, there was originally a brick vault (a possible tunnel vault) with four supporting pillars, the remains of which were found in the excavation of the tower. The west-facing doorway of the ground floor was walled up during the Middle Ages. Like other parts of the wall,

[1] Suna & Kykyri 1985-1988; Suna & Venhe 1989-1997; Suna 1994b, p. 14-15.
[2] E.g. Hausen 1883, p. 52 , plan of the castle; Rinne 1904, p. 8; Gardberg 1952, p. 8 and ground plan.
[3] Suna & Venhe 1989-1996; Uotila 1990-1997.
[4] Uotila 1990-1997.
[5] Uotila 1990-1997.

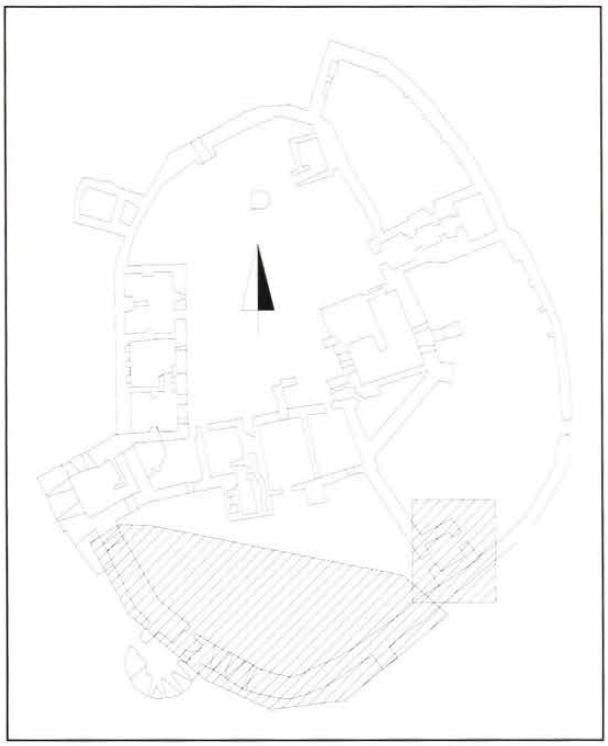

Fig. 60. Tower C and outer bailey I of the Kuusisto Castle.

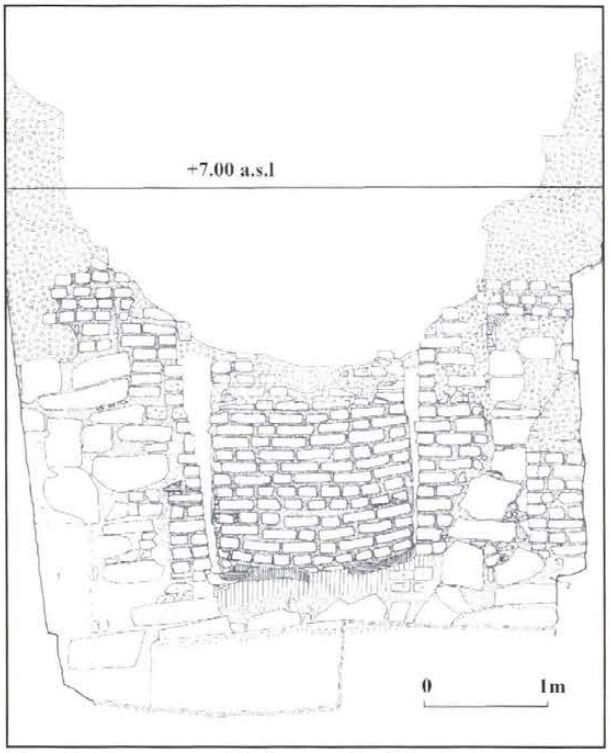

Fig. 61. The west wall of tower C of Kuusisto Castle. The west wall of tower C originally had a brickwork opening facing outer bailey I, but this feature was already walled up during the Middle Ages. All corners of the tower had a brick pilaster, suggesting that the bottom storey was vaulted (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.).

the wall section here had apparently begun to lean towards the south in the Middle Ages.[1]

6.5.5. The walls of outer bailey I

The research literature generally maintains that the walls of outer bailey I, dated e.g. by Gardberg to the late 15th century, are the youngest components of Kuusisto Castle.[2] Outer bailey I played an important role in the defence of the castle, for it was the point of access to the castle from the main body of the island of Kuusisto. Similarly, the south front of the main castle with its large arched doorways and palatial part was one of the main focuses of defence. This was already noted by Aarne Heimala in the early 1960s (Fig. 60).[3]

Field work at the turn of the 1950s and '60s involved repairs to large parts of outer bailey I, in which connection its was observed that the wall consisted of two structurally different parts.[4] The wall of the south part, from tower C to the large cannon embrasures, was originally faced with brick in double-stretcher Flemish bond and filled with stone, but with supporting structures of brick two courses wide passing through the stone fill at intervals of approximately two metres. In this configuration, each masonry part formed a component delimited with brickwork (Plates XXXIII, XXXIV). A similar construction can still be seen in the north and west walls of tower A in the northwest corner of tower A. In addition, the same exceptional brickwork technique was used in the presently underground section of wall to the south of tower A.[5]

[1] Suna & Venhe 1990-1997; Uotila 1990-1997.
[2] E.g. Gardberg 1993a, pp. 128-129.
[3] Sketches of maps and plans by Aarne Heimala; Archives of the Department of Monuments and Sites, NBA. Kuusisto.

[4] Heimala & Tapio 1958-1962.
According to an early-20th-century drawing by Ahrenberg, outer bailey I had brick arches on top which was a wooden defence platform and crenellation along the top of the wall. (Ahrenberg 1901, p. 21; Rinne 1904, p. 31). No observations of a structure of this kind have been obtained in the area of outer bailey I, but Ahrenberg's conception largely corresponds to the picture hitherto obtained of the walls of outer baileys II and III.
[5] Heimala & Tapio 1958-1962.

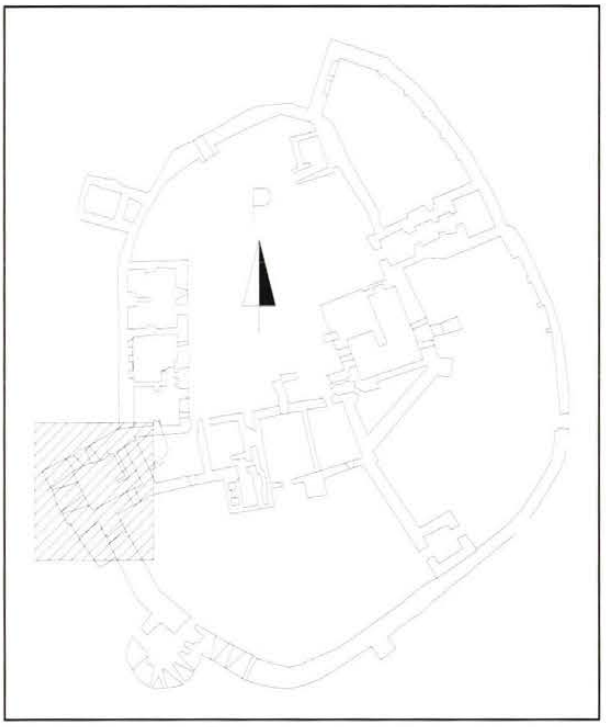

Fig. 62. Tower A of Kuusisto Castle.

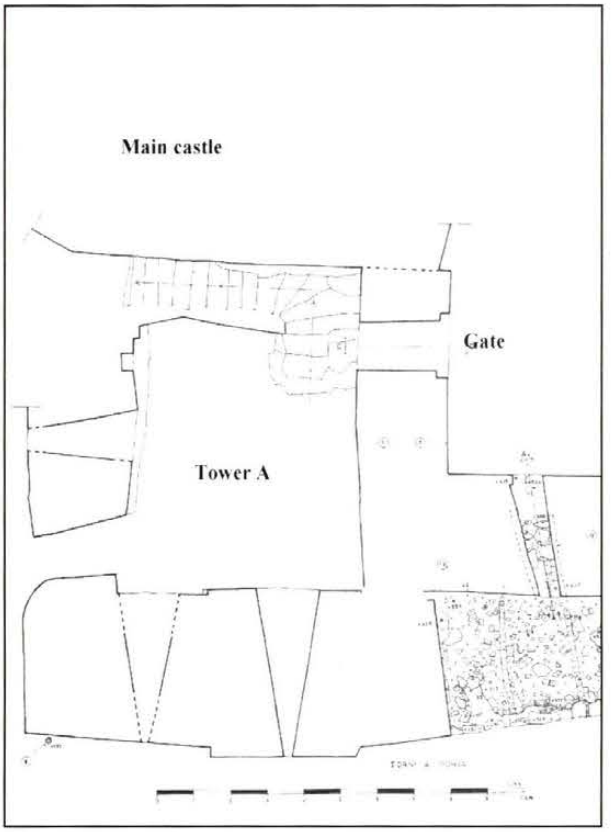

Fig. 63. The plan of the tower A of outer bailey I of Kuusisto Castle. (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

In the middle of the wall is a different structure in which the interior of the Flemish-bond wall is of highly irregular brick and stone material, with large areas filled with mortar. This section of the wall also contains long, mostly NW-SE oriented cracks and collapsed parts suggesting that the wall had shifted considerably.

The different structure is limited to two large embrasures south of tower B and it continues towards the north past the round tower as far as tower A, where the south wall of the tower belongs to the same structure.[1]

It is possible that, like in the other outer baileys, the outer wall of outer bailey I was built in two stages. This is suggested by the two different techniques. Furthermore, there are indications that the original brick face of the wall was altered to masonry already in the Middle Ages. In this connection, at least one of the original embrasures was bricked up.

In the north wall of outer bailey I is a metre-wide brick-line gateway, which was noted to have been walled up in the first excavations at the site.[2] The location and height of the opening do not link it to the structures of tower A. Like the opening in the northwest wall of outer bailey III it may be a small postern. In both locations there was a steeply sloping face of bedrock outside the opening that could have been used as a landing site. The gateway of outer bailey I is assumed to have been walled up when tower A was built.

6.5.6. Tower A

Only the western outside wall of tower A was found in Reinhold Hausen's excavations. The area was apparently excavated more in later decades, because Rinne claims that there was a four-sided "outer fortification", some kind of outer bailey, at the site. It was only in Gardberg's guide book that the structure was first called tower A (Figs. 62 and 63).[3]

The tower was built at a difficult location. Parts of the north and south walls are on smooth bedrock, while parts rest on a thick layer of clay. Accordingly, the structures have sunk and shifted to a great degree and almost the whole tower has been destroyed.

The west and north walls of the tower were mostly faced with brick and there were brickwork supports within the walls. The bottom storey of the tower originally had four large embrasures tapering

[1] Heimala & Tapio 1958-1962; Uotila 1990-1997.
[2] E.g. Rinne 1904, pp. 6-7.
[3] Hausen 1883. Ground plan of the castle; See Gardberg 1952, pp.12-13; Rinne 1904, pp. 6-7.

outwards. Two of these were in the west wall and two were in the north wall.[1]

During the construction stage, the north wall of outer bailey I also served as the south wall of the tower and was clearly located apart from the other walls of the tower. The west outer wall is roughly four metres thick and the north wall is over three metres thick. The outer walls of the tower are exceptionally thick and point to the use of the tower specifically by artillery. The brick staircase of the east wall led to the second storey.[2]

Linked to the west wall of tower A on its south side is a low foundation of a masonry and brick wall, extending at least a few metres in front of the west wall of outer bailey I. The complete size and function of this structure are still open, because it has not been excavated yet. It is, however, possible that this was a structure linking tower A with the wall of outer bailey I.

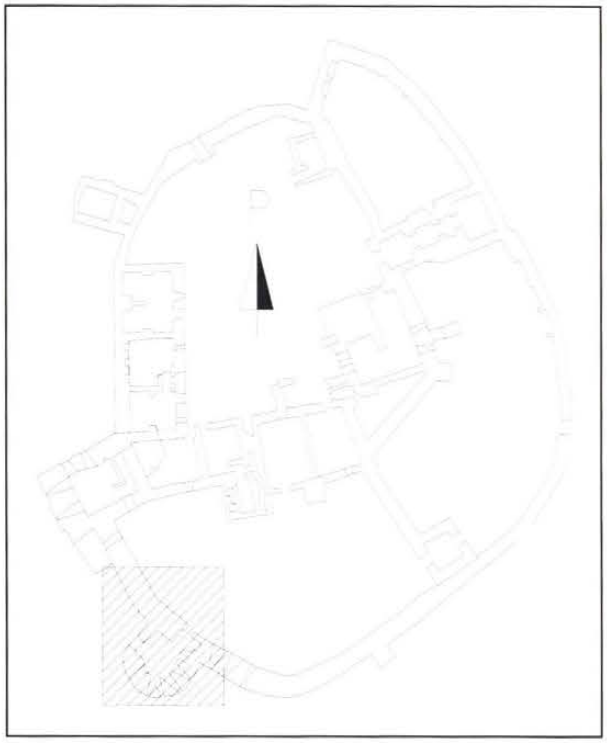

Fig. 64. Tower B of Kuusisto Castle

6.5.7. Tower B

Tower B, a semi-circular cannon tower, was built in the central part of outer bailey I on the route leading from the island of Kuusisto to the castle. The tower differs from other round cannon towers in Finland in that it was also the gate tower of the castle and had apparently been the main entrance of the castle.

The tower was already excavated in the 1870s, at which stage only two of the five embrasures of the bottom storey of were open. Three had been already been walled up in the Middle Ages.[3] Later investigations, particularly at the turn of the 1950s and '60s, revealed two embrasures at a higher level, which were also part of the lower storey. The five embrasures at the lowest level show that the structure was an actual cannon tower with a firing sector covering most of the terrain in front of the outer bailey (Figs. 64, 91 and 92).

The structures of the tower have revealed several indications of two stages of construction. In digging the floor of the tower, two floor pavements were found. The lower one was clearly inclined southwest and west and extended to beneath the interior walls. Furthermore, at least some of the embrasures had a distinct joint indicating that the tower had been widened towards the interior.[4] This would also explain the exceptional feature that the openings of two embrasures meet in the bottom storey. They had originally been adjacent to each other and had not been joined until the second construction stage. The walls of the original tower were ca. 2-2.5 metres thick and the tower was built against the outer wall of outer bailey I. The tower gate, also the main gate of the whole castle, was in the northwest part, from where there was access through the ground floor to the ward of outer bailey I (Plate XXXV).

In the second construction stage, the whole tower was raised in height, as the new floor is roughly half a metre higher than the old one. The lowest embrasures were now left at a very low level, and were therefore walled up. Moreover, the embrasures are clearly inclined outwards - like the older floor — and perhaps for this reason as well it became difficult to use them (Fig. 92).[5]

6.5.8. Tower group 12

In the early stage of investigations the structure to the northwest of the main castle was almost completely bypassed, and for example Gardberg regards structure 12 as some kind of a supporting structure.[6] It was not excavated until the 1960s.

[1] Heimala & Tapio 1958-1962; Uotila 1990-1997.
[2] Uotila 1990-1997.
[3] Hausen 1883, pp. 50-51. See Rinne 1904, p. 7.
[4] Heimala & Tapio 1958-1962.

[5] On the rare structural solutions of the round tower, such as the low embrasures, see Tuulse 1956, pp. 383-384.
[6] E.g. Gardberg 1952, p.21, Rinne 1904, p. 13.

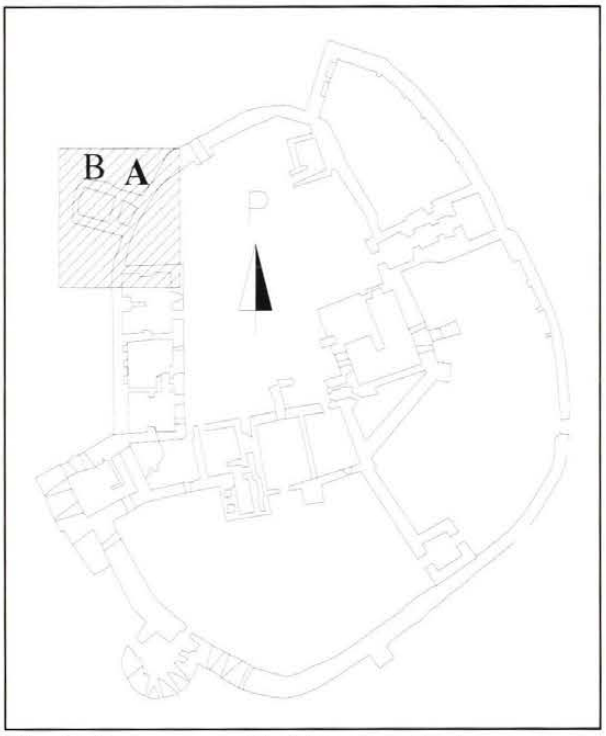

Fig. 65. Tower group 12 of Kuusisto Castle

It revealed a tower structure with two rooms that had stood apart from the rest of the castle structures at the northwest corner.[1] The topography of this area differs from the other parts of the castle in that there is a steep rock slope in the west part. Owing to the contours of the terrain, the walls of the larger outer bailey could not be built there, or were not necessary.

Tower structure 12 was built directly on bedrock with a lowest elevation of +1.80 m a.s.l. From this elevation, the west wall rises mainly as a mortared stone wall. The tower contains two rooms, of which 12 A, a low brickwork space, is closer to the main castle; 12 B a large room of masonry construction faces the perimeter. It is possible that the tower was originally built apart from the main castle and that it was not until the second stage that a small annex (room 12 A) was built to link it completely to the castle (Fig. 65, Plates XXXVI, XXXVII).[2]

In the 1980s excavations were conducted at the foot of the northwest wall of the tower. The field work revealed a thick layer of dung/humus and soil and a few coins of the late 15th century that were clearly associated with the period when the tower was in use. It is highly possible that tower was, at least at some stage, the *dansker* or privy tower of the castle.[3] Its location directly at the waterline was typical of towers of this type.

6.5.9. The household bailey of Kuusisto Castle

The episcopal castle of Kuusisto was the main site of activity of the episcopal mensa of Turku. When the castle was taken over by the crown in the 1520s, the episcopal manor and its tenants and livestock also passed to the crown. It was apparently not long after the demolition of the castle that the present manor of Kuusisto came under construction, for according tax records of the 1540s the manor had a large amount of livestock.[4]

Geology provides interesting additional information on the relationship of the castle and the manor. Recent geological field work has included analyses of the amounts of coal particles in soil samples from the whole castle and manor area (Fig. 66).[5] The charcoal particle analysis presents an overall picture of the intensity of settlement and occupation in the environs of the castle at different times (without dating). The analysed samples suggest that immediately upon the colonization of the east end of Kuusisto island the castle cape area was occupied.[6]

Amounts of soot particles in the castle cape area display a distinct rise in all soot classes at the beginning of colonization. This might point to the fire of 1318 mentioned in historical sources and attributed to the Novgorodians who burned down the episcopal residence of Kuusisto or the castle while it was still under construction. There is no similar soot peak in the samples from the manor area. It was only when the soot particles of the castle area rapidly declined that the present manor area was occupied. This settlement has remained in place until the 20th century. The results of the soot particle analysis suggest that there was no early episcopal manor or residence in the present manor area in the 13th and 14th centuries. It is possible that there were small houses and dwellings associated with the castle in the present area of fields between the castle cape and Kappelinmäki hill. However, the focus of local settlement was clearly within the castle area.

[1] Miettinen & Suna 1991; Uotila 1990-1997.
[2] Suna & Kykyri 1985-1988; Suna 1994b, pp. 11-13; Uotila 1990-1997.
[3] E.g. Suna 1994b, pp. 11-13.
[4] E.g. Hausen 1881, Appendix II, pp. VI-XII.
[5] Wahlberg 1994, pp. 66-78.
[6] The analysis is by Jan-Erik Wahlberg and the related interpretations concerning the castle and the manor are by the present author.

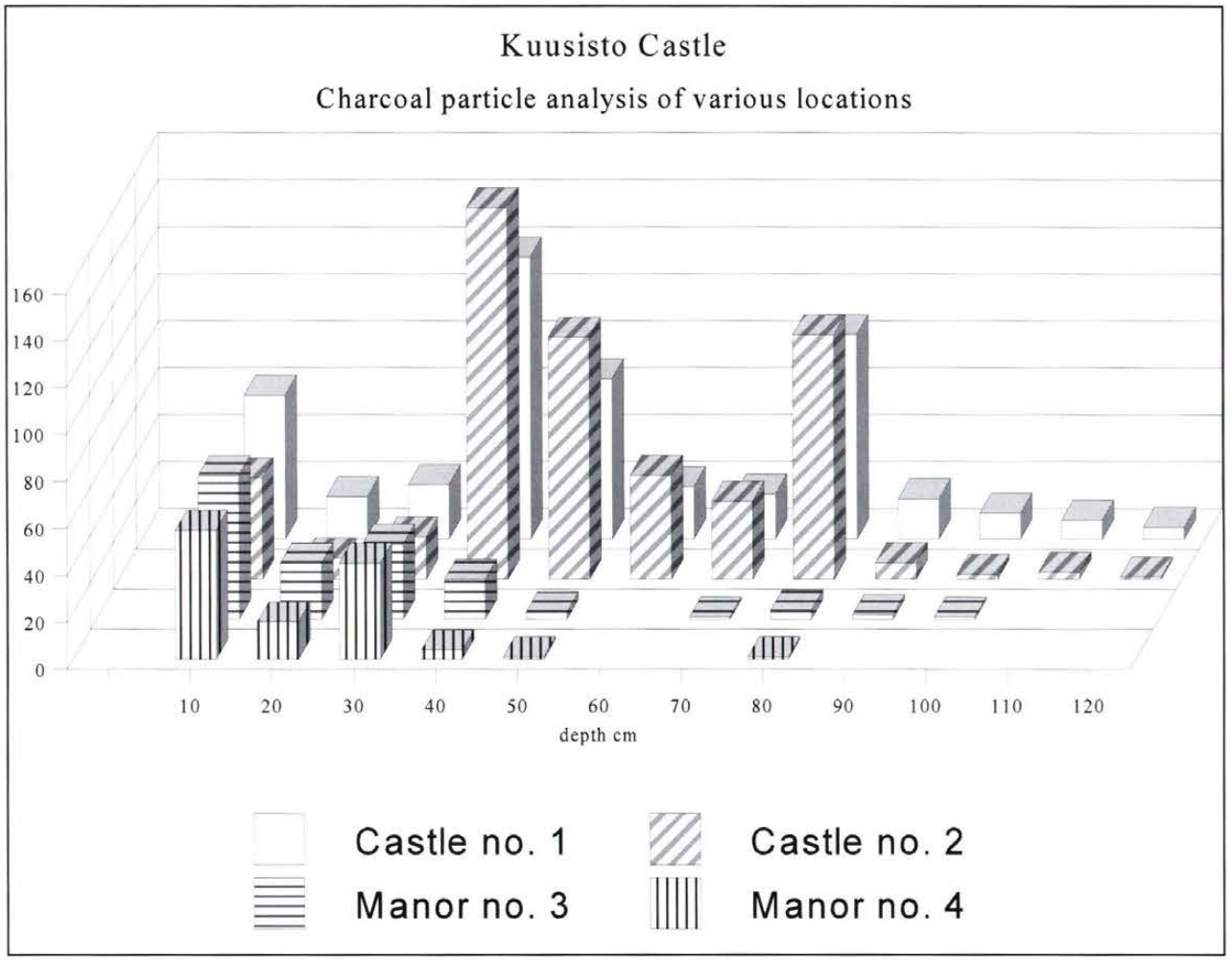

Fig 66. Charcoal particle analysis of Kuusisto Castle and environs.
Charcoal particle analysis permits investigations of the amount of charcoal in the soil and their particle size. Large amounts of charcoal particles point to fires and widespread use of fire. Samples 1-2 are from the area of Kuusisto Castle, and samples 3-4 and from the area of Kuusisto Manor (ca. 500 metres from the castle). The castle samples point to a distinct concentration of soot 40-80 cm below present ground level. I would interpret this as showing that the castle area was the first centre of permanent settlement during the Middle Ages and that occupation did not spread to the manor area until post-medieval times. (Wahlberg 1994, pp. 72-74; drawing by K. Uotila)

6.6. The Dating of the Outer Baileys of Kuusisto Castle

Earlier researchers have mostly been in agreement in dating of the walls and towers of outer baileys II and III at Kuusisto to the first half of the 15th century and they have been specifically attributed to Bishop Magnus II Tavast. It has also been assumed that the walls of outer bailey I are from the close of the 15th century and that the round tower, from the turn of the 15th and 16th centuries was the last construction work undertaken at the castle.[1] There are no archaeological finds on which these dates can be based. The conception is mainly based on the general history of construction of Kuusisto Castle and a few historical references, for example to Bishop Magnus Tavast's building activities at the castle.[2]

The outer baileys as such are not mentioned even once in medieval sources and there are no direct historical sources on their stages of construction.[3]

[1] E.g. .Gardberg 1952, pp. 29-30 and 1993a, pp. 122-127.

[2] On the difficulties of dating the castle prior to detailed investigations, see e.g. Gardberg 1993a, pp. 127-128.

[3] FMU I-VIII; REA; Juusten 1988; Linna 1989.

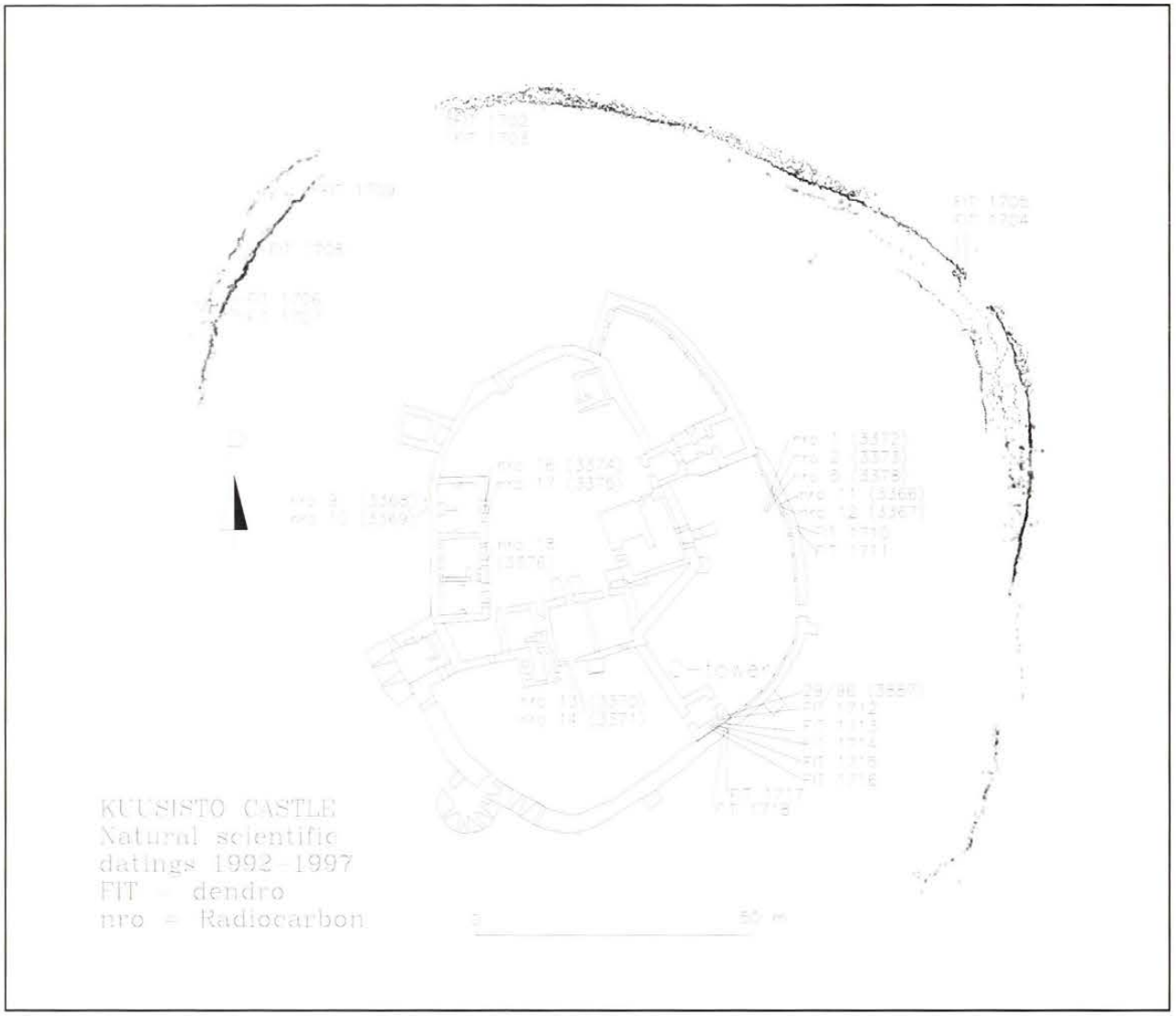

Fig 67. Samples for scientific dating procedures taken from the area of Kuusisto Castle 1992-1997. The dendrochronological samples are prefixed FIT and the radiocarbon samples are given a sampling number and a Hel designation in parentheses. (Drawing by K. Uotila)

6.6.1. Archaeological dating

Research conducted in 1985-95 provided a large number of new constructional details of the outer baileys, and extensive archaeological excavations were also carried out. The most important excavations concentrated in the area of outer bailey II, where cultural layers approximately two metres thick were excavated. Most of the excavated material still remains to be studied and at present only the coin dates from the area are available.[1]

The coins from the area of outer bailey II date from the early 14th century onwards and they grow in number around the middle of the century. The wall surrounding outer bailey II was built before the soil layers containing the 14th-century coins formed in the area. The stratigraphy of the layers dates the

[1] The whole coin material from Kuusisto has been comprehensively studied only by Taavitsainen (Taavitsainen 1980), but the ward of outer bailey II was not excavated until after his studies. The recent coin finds (from 1986-1996) have been dated by Pekka Sarvas of the Coin Cabinet of the NBA, but the material has not been published (Sarvas 1993 & 1996). On the chronological distribution and locations of the coins, see Suna 1994b, pp. 10-23; Uotila 1994b, p. 30, Uotila 1995, pp. 47-48.

A typical feature of the coin finds from Kuusisto Castle is that their years of minting begin in the early 14th century and continue until the 1520s, i.e. very close to the events of 1528. These coins clearly show that at least in the 1520s contemporary coinage was in use at the castle and not, for example, coins 50 years old. The suggested interpretations of a long period of circulation for medieval coinage do not seem very convincing on the basis of the Kuusisto material. Cf. Carlsson 1993, pp. 19, 75-77 or Törnblom 1996, p. 87 on the Castle of Kastelholm. On coin dating in general, see e.g. Barker 1995, pp. 205-206; Jonsson 1996, pp. 79-84; Klackenberg 1992, pp. 43-44.

walls to the 14th century at the latest, possibly to its second half.[1]

6.6.2 Radiocarbon dates

In 1992, a total of 12 samples for radiocarbon dating were taken at Kuusisto Castle. Nine of these were of mortar in the walls, one was a mortar sample from the ground, and two were charcoal samples.[2] In 1992 the excavations focused on outer bailey II and the west wing of the main castle, which means that also the samples are from these areas. This was mostly an experiment for establishing the applicability of the radiocarbon dating of mortar from sites such as Kuusisto Castle.

The material can be divided into four groups according to area (Fig. 67). The first area is the wall flanking the east part of outer bailey II and the charcoal and mortar layers associated with it. Two samples of the excavated section of wall were taken from different elevations but with the assumption that this was the same wall. There is, however, a clear discrepancy between the dates obtained for the lower part of the wall (Hel-3367) and the upper part (Hel-3366), which could be interpreted as suggesting two different stages of the wall. Accordingly, the lower part would date from as early as the 14th century and the upper part from the 15th century. If we follow the interpretations following from the investigations of the wall and combine samples Hel-3367 and Hel-3366, they can be jointly dated to the period 1396-1476 (1 sigma). The mortar layer of the ward (Hel-3378) apparently dates from the same stage as the upper part of the wall. Together, the two wall samples and the mortar layer of the ward are dated to the years 1410-1464[3] (1 sigma). This date is clearly in conflict with the coin dates from the excavated area by the wall, according to which the wall already erected in the 14th century. On the other hand, an upright post under the wall of outer bailey II could be dendrochronologically dated to the period after the winter of 1438-1439. This date is in good agreement with the radiocarbon dates (Fig. 68).

The relationship of the lower (Hel-3373) and upper (Hel-3372) charcoal layers of the ward shows that here, too, there is a clear chronological difference between the layers, although they were interpreted to be contemporaneous in the excavation situation. The lower charcoal layer is dated to 1316-1342 or 1392-1465 and the upper layer is from 1448-1524 or 1558-1630 (1 sigma).

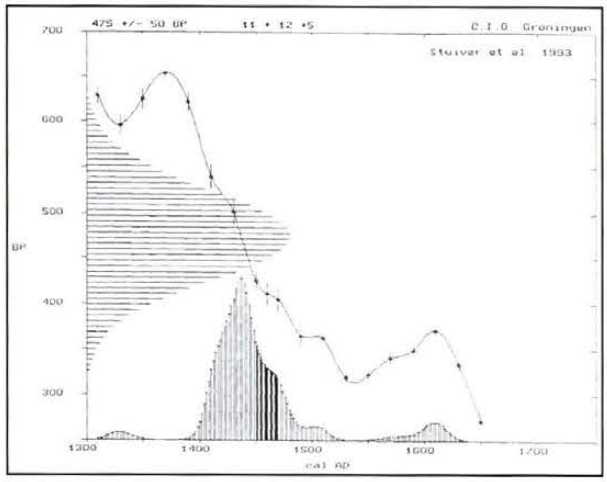

Fig 68. Radiocarbon dates of the east encircling wall of outer bailey I of Kuusisto Castle. Mortar samples Hel 3366 and 3367 were taken of the outer wall of the outer bailey, and Hel 3378 from the mortar layer in front of the wall (detailed results in table 4). The compiled date for the three samples falls into the first half of the 15th century, the most probable time of construction being the 1430s. The dendrochronological samples (FIT 1710-1711) show the foundation post of the wall to have been felled in the winter of 1438-39. (Fig. Jungner 1994a)

The second sampling location was the western outer wall of the west wing, where four bricked up log niches were discovered in the outer face of the wall in 1991. Two of these provided sufficient mortar for dating samples. In the investigation of the walls it was assumed that these niches were associated with the first stage of the wall, i.e. the 14th century. Sample Hel-3368 falls into the periods 1446-1528 or 552-1634 and Hel-3369 is from 1402-1516 or 1588-1626. Combined, the samples are dated to the periods 1434-1514 or 1592-1624 (1 sigma). The dates for the mortar in the niches were clearly later than the results of the building-archaeological interpretation.

The third sampled area consisted of the doorways in the east walls of rooms I and K in the west wing of the main castle. Investigations of the doorway of the east wall of room I revealed a brickwork structure older than the present doorway, but it did not provide enough mortar for a sample. On the other hand it was possible to obtain sample Hel-3374 from the lower part of the present wall, which dates from the period 1302-1364 or 1376-1416. Behind the present doorway of room K were the remains of the

[1] Sarvas 1993 & 1996; Suna 1994b, pp. 15-18; see Gardberg 1993a, p. 124.
[2] Jungner 1994b.
[3] All the dating results given in the text are 1 sigma dates. Other dating information is given in Table 4.

Lab. no.	$\delta^{13}C$	Age (BP)	1 sigma (68.3%) cal AD	2 sigma (95.4%) cal AD
Hel-3366 (nro 11/L)	- 15.2	460 ± 90	1402 - 1516 1588 - 1626	1306 - 1356 1384 - 1648
Hel-3367 (nro 12/ L)	- 22.9	530 ± 90	1304 - 1362 1380 - 1459	1289 - 1520 1570 - 1628
Hel-3368 (nro 9/ M)	- 12.7	380 ± 90	1446 - 1528 1552 - 1634	1402 - 1674 1776 - 1800 1930 - 1938 1951 - 1954
Hel-3369 (nro 10/M)	- 12.3	460 ± 90	1402 - 1516 1588 - 1626	1306 - 1356 1384 - 1648
Hel-3370 (nro 13/ M)	- 7.3	300 ± 90	1472 - 1672 1778 - 1798 1951 - 1953 1953 - 1953	1436 - 1696 1720 - 1816 1842 - 1866 1918 - 1941 1950 - 1955
Hel-3371 (nro 14/ M)	- 6.6	350 ± 90	1459 - 1646	1414 - 1680 1754 - 1806 1926 - 1940 1950 - 1954
Hel-3372 (nro 1/ C)	- 23.9	380 ± 80	1448 - 1524 1558 - 1630	1408 - 1668 1784 - 1794 1951 - 1952
Hel-3373 (nro 2/ C)	- 24.9	510 ± 70	1316 - 1342 1392 - 1465	1298 - 1514 1592 - 1622
Hel-3374 (nro 16/ M)	- 20.6	590 ± 80	1302 - 1364 1376 - 1416	1278 - 1461
Hel-3375 (nro 17/ M)	- 21.3	240 ± 90	1522 - 1564 1628 - 1688 1734 - 1812 1922 - 1941 1950 - 1954	1482 - 1824 1828 - 1886 1912 - 1942 1950 - 1955
Hel-3376 (nro 18/ M)	- 17.4	560 ± 90		
Hel-3378 (nro 5/ M)	- 22.4	440 ± 80	1414 - 1516 1592 - 1624	1322 - 1338 1394 - 1648
Hel- 3370 + 3371			1486 - 1608 1610 - 1648	1442 - 1672 1776 - 1800 1932 - 1936 1951 - 1953 1954 - 1954
Hel 3366 + 3367			1396 - 1476	1304 - 1360 1380 - 1518 1574 - 1626
Hel-3366 + 3367 + 3378			1410 - 1464	1322 - 1334 1396 - 1516 1592 - 1624
Hel- 3368 + 3369			1434 - 1514 1592 - 1624	1416 - 1536 1538 - 1636
Hel- 3374 + 3376			1308 - 1354 1386 - 1422	1296 - 1436

Table 4. Radiocarbon dates for Kuusisto Castle. Calibrated according to Stuiver et al. 1993 (Jungner 1994a). M = Mortar sample and C = Charcoal sample

older wall (Hel-3376), which are dated to the periods 1302-1364 or 1378-1438. Combined, these samples are dated to the periods 1308-1354 or 1386-1422, and are thus the oldest dated samples from the castle. The third sample from the same area is from the brickwork in the upper part of the doorway of room I (Hel-3375). However, the age of the sample clearly points to later masonry repairs.

The fourth group of samples was obtained from the wall masonry of the part above the entrance to the main castle, where there were two vertical sections of masonry. Both samples had an exceptionally high ^{13}C - isotope, which may have led to results that appear to be too young. The ages obtained for both samples (Hel-3370 and Hel-3371) mainly fall into the 16th and 17th centuries.

The most significant results in view of the architectural history of the outer baileys were obtained from outer bailey II. There the lower part of the surrounding wall and the lower charcoal layer may be from as early as the 14th century, but the upper part of the wall and the earth layers are from the 15th century.[1]

In 1996 a birch-bark sample (Hel-3887) was taken from the log framework of tower C.[2] During the excavation it was assumed that the bark was in direct association with the log framework and the construction of the wall[3]. The bark was given the age of 620 ± 80, i.e. 1250-1330-1410 with a 50% probability of being from 1351, at any rate from the 14th century.

6.6.3. Dendrochronology

The palisade

In the summer of 1992, the first posts of the multi-part palisade surrounding the castle were discovered in the present waters by the shore. The palisade was mapped during 1992-1993.[4] A total of eight timber samples were taken for dendrochronological studies. Dates were obtained for a total of seven pine posts, the oldest of which was felled in the winter of 1401/1402, the main part being from 1410 and 1411 and the youngest from as late as the 1430s. It is possible that the palisade was mainly built in the years 1410-1411, when previously felled timber was also used. On the other hand, the timber from the 1430s is most probable associated with repairs to the palisade (Fig. 67).[5]

The palisade has been revealed on the west, north and east sides of the castle, where there is still open water or rushes. It is obvious that part of this structure is beneath present fill around the castle. The known part of the palisade corresponds to the contours of the outer walls of the outer baileys, which might suggest that the outer bailey walls were built before the posts were driven, i.e. at the turn of the 14th and 15th centuries at the latest.

The east wall of outer bailey II

In 1993, excavation section 9301 beneath the east wall of outer bailey II revealed two upright posts of which samples were taken (FIT 1710-1711).[6] The samples were dated in 1996. Both are most probably from the same tree and the year-rings in both end at the year 1438, whereby the foundation of the wall of outer bailey II was laid after the summer of 1438 (Fig. 67) .[7]

It can also be assumed that the two upright posts had to do with secondary repairs to the leaning wall. The timbers would thus date the repairs to the late 1430s. These were not the only upright posts; earlier studies show that beneath many parts of the outer wall of outer bailey II are upright posts driven sparsely into the ground under the wall structure. The outside face of the wall has no signs of repairs clearly dating to the Middle Ages, which placed doubt on the suggestion that the posts are a secondary feature.

In 1997 several foundation posts were discovered at the joint of outer baileys I and II in front of tower C (Fig. 67). It was possible to date two of these (FIT 1717 and 1718). The new results suggest that the wall of outer bailey II came under construction after the spring of 1439, however most probably before 1448.[8]

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[1] All in all, the radiocarbon results for Kuusisto Castle were difficult to elucidate and they demonstrate the many opportunities for interpretation in the method. It should also be noted that conditions for the preservation of the original mortar were poor at Kuusisto Castle, because the ruins have been exposed to the element for hundreds of years. A third source of error at Kuusisto Castle may be the fact that the sampling did not succeed in the best possible way. This may explain why some of the samples are dated to as late as the 20th century.

[2] Jungner 1996.

[3] Antti Suna, personal communication July 1996.

[4] The field documentation of the palisade was the work of the *Saaristomeren sukeltajat* divers' association.

[5] Zetterberg 1993b.

[6] Suna & Venhe 1989-1997.

[7] Zetterberg 1996.

[8] Zetterberg 1998.

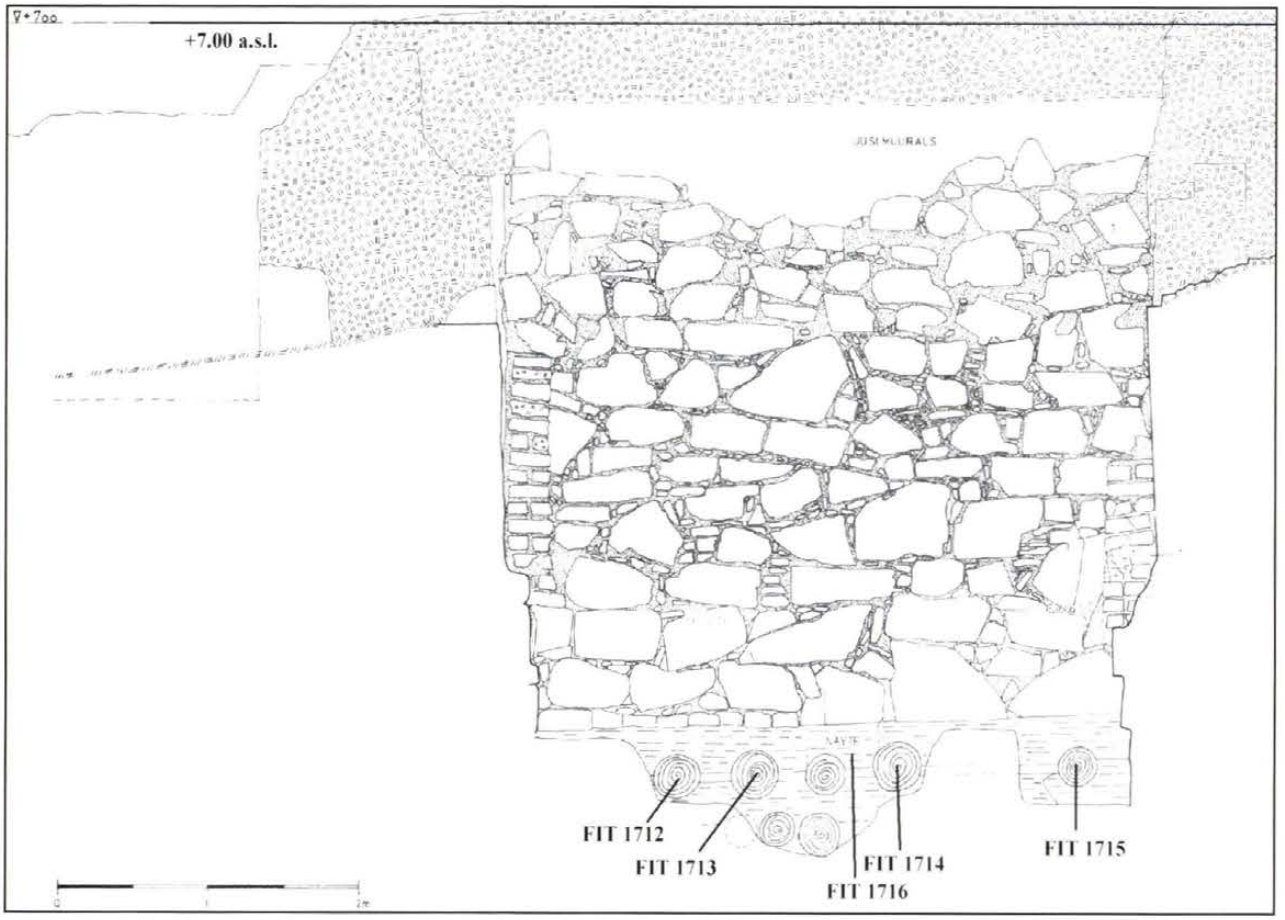

Fig. 69. The log foundation and stonework of tower C of Kuusisto Castle. Tower C was built on top of a thick clay layer and the tower was built on a four-course log framework, in which the lowest course of logs was at elevation ca. +1.50 a.s.l. Five timber samples of the framework were taken (FIT 1712-1716), which have been dated to the 1430s. (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

Tower C

A four-course log framework was discovered in the foundations of tower C . In the summer of 1996 five samples were sawn from the logs for dendrochronological analysis (Figs. 67 and 69).[1] The results show that the pines of the framework were felled in the 1430s, most probably between 1434 and 1437. The dendrochronological results support the archaeological dates, as only 15th-century coins were found within the tower.[2] In this respect, the finds clearly differ, for example, from the ward of outer bailey II, where large numbers of 14th-century coins were found.

6.6.4. The geological development of the castle site at Kuusisto

In 1991, Jan-Erik Wahlberg, a student of geology, began his studies on the geological history of the cape at Kuusisto where the castle is situated (Fig. 70).[3] The selected material included the archaeologically excavated areas. The geological and archaeological material permits a reconstruction of original ground level of the castle's environs and changes in it during the period of use of the castle. The most important result with regard to the outer baileys is the fact that during the 14th century an isthmus formed connecting the site with the main body of Kuusisto Island. Already at that stage, this was a prime direction of communication for the castle. It was also observed that the land areas of all the outer wards were dry land by the turn of the 14th and 15th centuries.

[1] Zetterberg 1996.
[2] Sarvas 1993 & 1996.
[3] Wahlberg 1994, pp. 66-78.

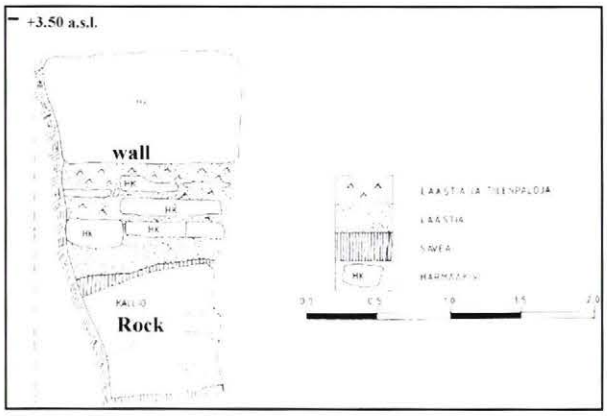

Fig. 70. Foundation of the west wall of tower 12 of Kuusisto Castle. Tower 12, located on the northwest side of the main castle, was built on bedrock as a mortared stone wall at elevation ca. +1.70-+1.80 a.s.l. (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

6.7. The History of the Outer Baileys of Kuusisto Castle

At best, various dating methods support each other to provide an integrated overall picture, but in most cases there are distinct differences among the results. Until the end of 1996 a largely uniform chronological framework was available for Kuusisto. This was based on the archaeological artefactual dating of outer bailey II, the dendrochronological dates obtained for the palisade and radiocarbon results.[1]

In late 1996, this model, however, had to be re-evaluated, because according to dendrochronology the foundations of the east wall of outer bailey II and tower C date from the second half of the 1430s at the latest.[2] According to the earlier concept, they were definitely from the 14th century.

It is possible that there were two stages in the eastern wall of outer bailey II, of which the first one comprised only the lowest part. Although there are no observations of any joint, the radiocarbon dates obtained for the wall mortar and the charcoal layers adjacent to the wall (Hel- 3365, 3366, 3372, 3373) might suggest such a possibility. It would thus be possible that the layers with numerous 14th-century coins would have formed against the wall of outer bailey II, of which only the lower part survives (Fig. 66).

[1] Uotila 1995, pp. 44-46; Wahlberg 1994, pp. 76-77.

[2] On the chronological framework, e.g. Gardberg 1993a, pp. 123-124; Suna 1994b, 18-20; Uotila 1994b, 27-30 and Uotila 1995, 43-46.

Construction in the 14th century

The research results of the past ten years suggest that the 14th-century dating of the oldest stage of the castle, as proposed by Hausen, Rinne and Gardberg, is correct.[3] The archaeological and scientific dates are mainly from outer bailey II, but the structural details of the whole castle make it obvious that parts of the main castle were already built by that time. Among the oldest parts of the main castle are the three-room, originally single-storey, stone building of the west wing and the single-room, low stone building of the east wing. With reference to the few artefact-based dates available, the west wing of the main castle may be from the early 14th century.[4]

It is possible that already in the 14th century the castle included parts of the outer baileys. The lower parts of the walls of outer bailey II may be from that period and the structural joints suggest that is also true of parts of tower D and parts of the wall of outer bailey III.[5] The triple palisade was possibly constructed around 1410 to follow the contours of this first stage (Fig. 72).

The early 15th century

The building stage dating from the early 15th century, the term of Bishop Magnus II Tavast, most probably included the construction of the palatial south section of the main castle. Associated with this feature was e.g. the large brick-arched portal or gateway in the south wall of the main castle.[6] It can be suggested that the mention in historical sources of construction "circa 1431", which is open to interpretation, refers to the main castle[7]. It can be assumed that from there construction work extended into the outer baileys, which means that the renovation of the whole castle would have lasted

[3] E.g. Hausen 1881, pp. 13-16 ; Rinne 1904, pp. 34; Gardberg 1978, Gardberg 1993a, pp. 122-129.

[4] Uotila 1994a, pp. 24-31 and Uotila 1995, pp. 37-52.

[5] The obvious problem of this interpretation is that there is no clear building-archaeological data pointing to the overlaying wall structures. On the other hand, the walls of outer baileys II and III have only been excavated in places. For example, in outer bailey III all the investigations of the walls have been restricted to the sections above present ground level.

[6] The term of Bishop Magnus II Tavast has long been regarded as the main building stage of Kuusisto Castle. See Gardberg 1952, p. 30 and 1993a, p. 124; Hausen 1883, pp. 16-7; Juusten 1988, p. 46; Rinne 1904, p. 35. On the 15th-century history of the main castle with reference to recent building-archaeological results, see Uotila 1994b, pp. 25-27 and Uotila 1995, pp. 43-45.

[7] "Cirka MCDXXXI Ille idem præsul (Magnus Tavast) ...pluribus & elatioribus, elegantioribusque castrum aedificiis Knustense (!)" Hausen 1881, p. 17 note 31, with the 17th-century antiquarian Messenius as the original source.

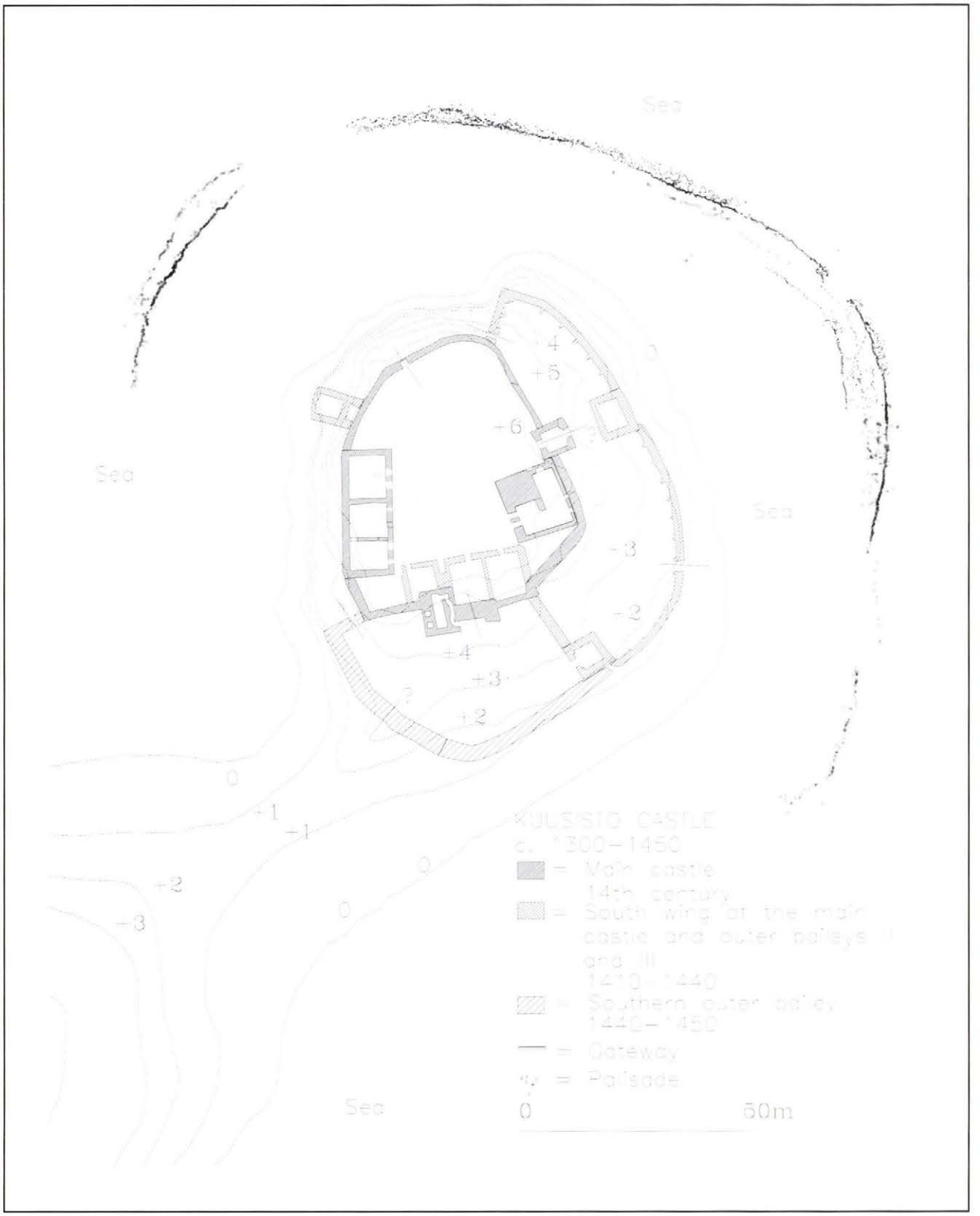

Fig. 71. History of construction of Kuusisto Castle, ca. 1300-1450.
The encircling wall of the main castle and the masonry buildings of the west and east wings can be dated to the 14th century, but extensive construction probably began in the first half of the 15th century, perhaps during the term of Bishop Magnus II Tavast in 1412-1450. Around 1410 the extensive palisade encircling the castle was built. The actual building work possibly came under way in the southern palatial section of the main castle in the 1420s, from where it expanded into the outer baileys in the late 1430s. In the outer baileys works began with the construction of towers C and D, followed by the brick-arched walls of outer baileys II and III. The encircling wall of outer bailey I was probably built during this stage. (Drawing by. K. Uotila)

throughout the 1430s, probably until the 1440s. It is also possible that the enlargement of the castle probably began in the 1410s and 1420s, when Kuusisto is first mentioned as a castle (Fig. 71). [1]

At this stage the walls of outer baileys II and III were fitted with relieving arches. It appears that the works included the construction of tower C and possibly the renovation of tower D. After this stage, the eastern outer baileys were faced with brick with large brickwork arches supporting the walls from the inside (Fig. 72).

The only discovered doorway of tower C faces outer bailey I, which indirectly suggests that also the latter was built during the same stage. The 1430s dating of tower C and indirectly of outer bailey I may suggest that a causeway was built or an isthmus formed to link the castle with the island of Kuusisto.[2]

Investigations of tower C have raised the question of the main routes of communication to the castle. The isthmus between the castle and the main island dried and became passable during the 14th century, and the low natural formation was possibly filled to provide a better road. Until 1995 it could be assumed that access to the castle by land along the walls of outer bailey I to the gate of outer bailey II, permitting surveillance of anyone approaching along the wall. According to this suggestion, the route of access would have continued through outer bailey II to tower C, and through its gateway to outer bailey I and the southern part of the main castle.

Investigations of tower C revealed, however, that it originally had only one brickwork opening at ground level and even this faced outer bailey I. The suggested long route of access via outer bailey II would thus have been impossible. Therefore, it is necessary to seek the main gateway facing the connection with Kuusisto Island in the area of outer bailey I. Here, the only possible older gateway is the gate in the north wall, which may have been blocked up when tower A was built.

It was also possible that there was some kind of gateway or gate tower structure at the location of the present round tower. In this area are exceptionally thick (2-3 m) layers of medieval fill suggesting that this location was raised in relation to its immediate surroundings. Indirect evidence of the important communicating role of the round tower is the fact

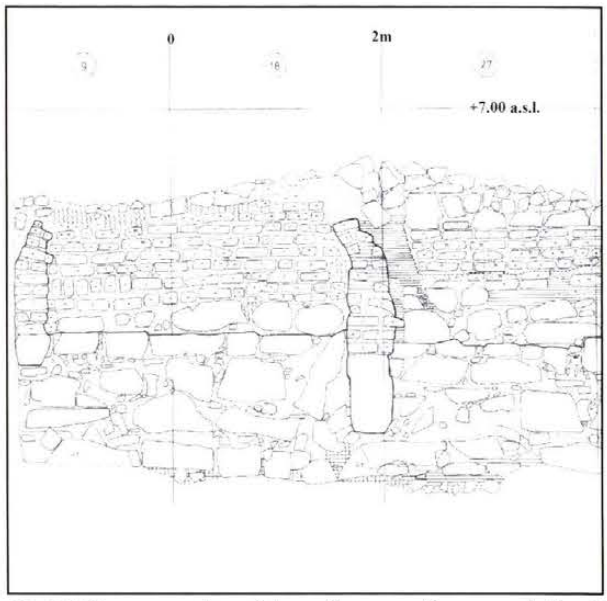

Fig. 72. The east section of the wall surrounding outer bailey II of Kuusisto Castle (view from the west). The original brickwork was revealed in excavations conducted in the 1980s. Beneath the later conservation layers was the original wall structure, with a threshold on top followed by brickwork with the remains of large brick arches. (The archives of the Dept. of Monuments and Sites, NBA. Kuusisto Castle.)

that in only very rare cases can round cannon towers also function as gate towers. Perhaps there was a gate structure or tower at the site since the early stages of outer bailey I, being replaced at the turn of the 15th and 16th centuries by a round tower retaining the function of the gate tower.

The age of tower 12 built on the northwest side of the main castle is still an open question. The details of the masonry, such as the use of roof tiles as wedges suggests that the tower was built around the turn of the 14th and 15th centuries, probably not until the 1430s and '40s. The archaeological dating is based on a few 15th-century coins, but these are clearly associated with the layers of use of the tower and do not date the early stages of its construction.[3]

After the walls of the outer bailey were completed in the 15th century, the castle was surrounded by a triple system of defensive works consisting of the walls of the main castle at the top of a rocky hill, the brick walls of the outer baileys by the shore and finally a palisade roughly two metres high outside the castle area in water approximately two metres deep.[4]

[1] The term "castro nostro Kusto" was first used of Kuusisto Castle in a letter of Bishop Magnus II Tavast of 1417-1428. (FMU 1884). See Hausen 1881, bilagor II, in which connection the letter is dated to ca. 1440. In the FMU collection the letter is dated to May 7, 1427 at the latest (FMU III, pp. 401-402). On more recent studies, see Gardberg 1993a, p. 123; Palola 1997 p. 175.

[2] Geological investigations show that such a connection was already possible in the late 14th century. Wahlberg 1994.

[3] Cf. Suna 1994b, pp. 10-13.

[4] Medieval trading vessels had a displacement of roughly two metres (E.g. Nurminen 1995, p. 50).

Fig. 73. History of construction of Kuusisto Castle, ca. 1450-1520.
In the late 15th and early 16th century the castle did not appreciably grow in area. The defence of outer bailey I was significantly improved with the construction of two cannon towers (A and B) and by renewing its walls. After the works, over ten embrasures faced the main island of Kuusisto. Elsewhere in the castle, renewal mainly concerned raising the height of the main castle and the outer baileys. (Drawing by K. Uotila)

The geological investigations suggest that the palisade was ca. two metres above the sea level of that time. The castle was surrounded by a shallow lagoon-type area.[1] There are no definite finds of pier or harbour structures but there are possible remains of some kind of pier or jetty amidst the palisade situated northeast of tower D.[2]

As the land bridge or isthmus joining the castle site to the rest of the island emerged during the 14th century, some kind of moat was needed between the castle and the island on the southwest side.[3] The area, however, has not revealed any of the mixed layers of clay and earth that are typical of moats;[4] the layers of clay in the area formed naturally.[5] This suggests that there was never an excavated and regularly maintained moat in the area but only shallow water serving as some kind of obstacle.

Construction work of the turn of the 15th and 16th centuries in the outer baileys

Around the year 1485, during the term of Bishop Konrad Bitz, a fire destroyed large parts of the castle, after it was reconstructed and refurbished in even better condition than before.[6] It is possible that the rooms of the southern palatial section were altered and the east and west wing of the main castle were raised to the height of three storeys.[7] In the outer bailey area, construction work no longer entailed enlargements, for the outer baileys had by now reached their medieval extent. New structures were the extremely large towers A and B of outer bailey I and the wall between them. (Fig. 73) All these new components were fitted with embrasures, the lowest of which were close to the ground level of the time. At the lowest firing level were at least 11 (possibly 13-14) large embrasures, most of which faced the area of shallow water between outer bailey I and the main island of Kuusisto. This was a system of defence that was particularly strong in Finnish conditions, with large cannon placed at low elevations to dispel attacks (Fig. 91).

In many places, the oldest walls and towers of the outer baileys were built on clayey soil. The bearing properties of the structures changed during the 15th and 16th centuries. Some of the structures were on a hard foundation (moraine or bedrock), while others stood on clay, which led to large fissures and cracks at the locations of different foundations. There were no major problems with outer bailey II and tower D, but the wall and gateway of outer bailey II clearly sank towards the east and at a few joints, the movement of the structures also damaged upper structures such as the timber firing platforms. The problems also extended to tower C, which leaned towards the south by several degrees. In the area of outer bailey I, the walls leaned towards the south (Fig. 73).

It was also necessary to renovate the outer baileys because of alterations to other parts of the castle. The brick-arched outer walls were quite low and had to be raised during the 15th and 16th centuries, by which stage the whole main castle had been raised to the height of three storeys. At this stage, the traditional defence of a medieval castle already called for the corresponding raising in height of the outer bailey walls. In outer baileys II and III the brick arches were walled up and the walls were most probably raised in height at the time. In outer bailey I, the alterations were more extensive, being partly caused by the construction of towers A and B.

The use of the originally steep-sloped wards of the outer bailey changed during the 15th century towards the growing household economic significance of the wards. At least the ward of outer bailey II was paved and levelled for improved use. There are also remains of several structures from this area. In outer bailey I, there are signs of filling the ward and constructing embankments. When the ward or yard areas were levelled, the lower parts of the brick-arch walls were covered by earth.

The repairs of the turn of the 15th and 16th centuries did not, however, improve the walls, which continued to sink and shift particularly in outer baileys I and II. Several external supports were constructed outside the walls and some of the embrasures had to be walled up. The reason for this was that they leaned towards the ground and were thus impossible to use. Therefore many parts of the outer baileys were in extremely poor condition when the ownership of the castle came under dispute in the 1520s.

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[1] Harry Alopaeus, who has studied the palisades of medieval castles, has often suggested that the posts were driven under the surface of the water. At Kuusisto, however, the geological analyses of several samples suggest lagoon-like conditions within the perimeter of the palisade (Wahlberg 1994. Cf. Alopaeus 1994, pp. 100-105).

[2] Alopaeus 1994, pp. 100-105 and Alopaeus 1996, p. 11.

[3] On the moat of Kuusisto Castle, see e.g. Hausen 1883, p. 49 with a plan of the castle area; Gardberg 1993a, p. 123.

[4] On the stratigraphy of a continually maintained moat, see e.g. Barker 1995, pp. 28-30.

[5] Wahlberg 1994.

[6] Master Konrad Bitz, ...Kuusisto Castle burned down to its foundations, and many of the charters of privilege and letters of the Cathedral burned. Juusten 1988, p. 50. "Castrum Cuusto funditis icentio casuali exuritus, et multa privilegia at litterae Ecclesiae comburuntur." See Hausen 1881, pp. 20-21. According to Hausen, the fire took place before 1486 and the repairs were completed in 1489. Magnus Särkilax, who succeeded Bitz as bishop, related that he incurred considerable expense as a result of the rebuilding of the castle (Hausen 1881, p. 24).

[7] E.g. Gardberg 1952, pp. 8, 30; Gardberg 1993a, pp. 122-129 and Uotila 1995, pp. 43-46.

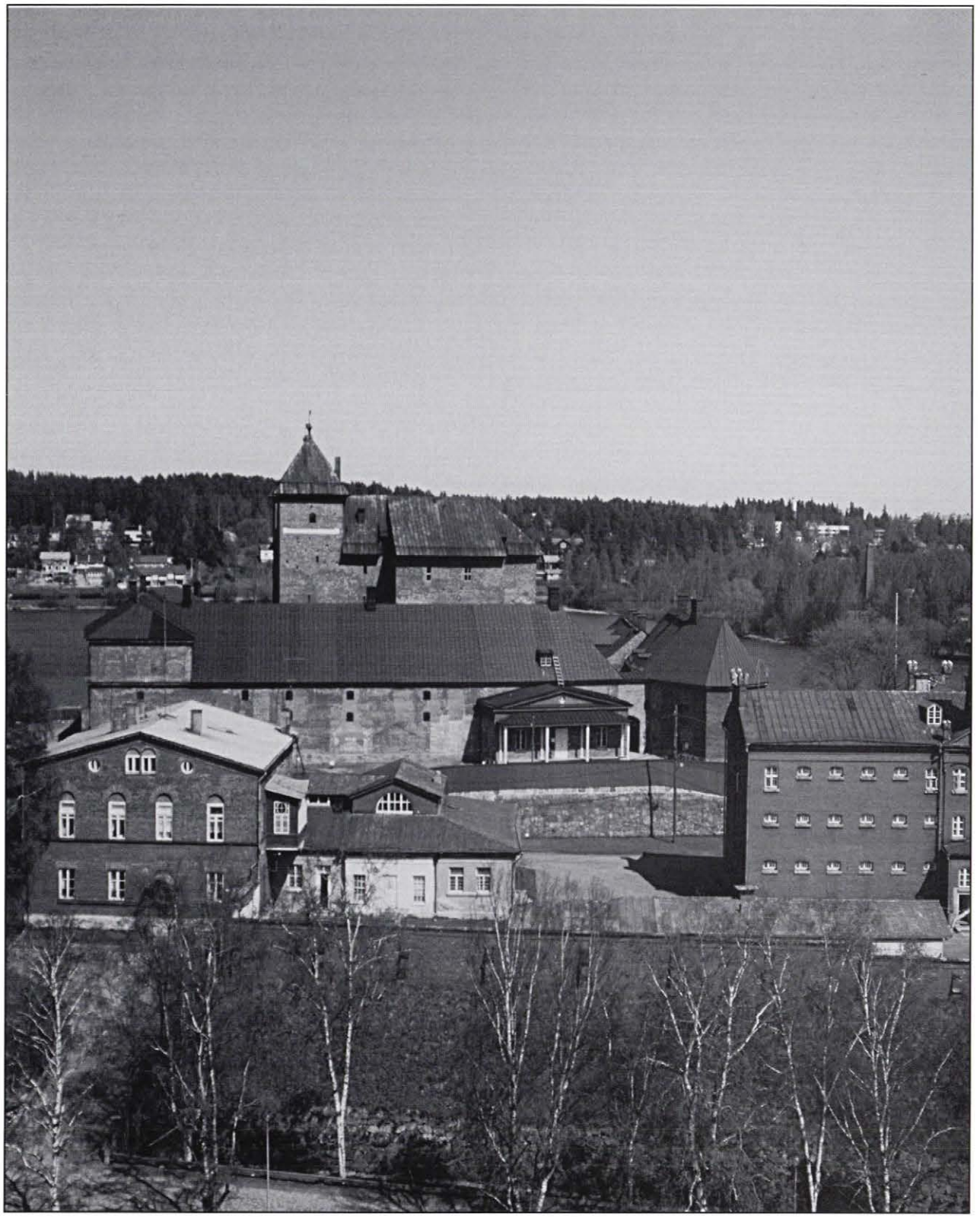

Fig. 74. Hämeenlinna castle (Sw. Tavastehus).
The castle of Hämeenlinna is first referred to in sources, along with the castles of Turku and Viipuri, in 1308 with the term hus. *In 1311 Novgorodian troops attacked "the castle of Vanai", but were unable to conquer it. In early 14th century the military role of Hämeenlinna castle diminished. In 1496, however, a Russian military campaign extended as far as the environs of the castle. The castle passed to King Gustavus Vasa from Danish troops in 1523 without a battle. During the 1560s and '70s it was reinforced with the addition of two rondells. King Gustavus II Adolphus visited the castle in 1614 and in 1639 the settlement next to the castle was given a town charter. Hämeenlinna castle became Finland's largest military depot in the 18th century and a prison in 1836. Restoration works began in 1953. View from the southwest. (Photo P.O. Welin)*

7. HÄMEENLINNA CASTLE

Hämeenlinna Castle is situated in the city of Hämeen-linna on a narrow moraine ridge on the south shore of Lake Vanajavesi (Fig. 74). During the Middle Ages and well into the 17th century, the castle was surrounded by a lake in the south and a marshy area to the west.[1] North of the castle was a moraine esker along which the old highway from Turku led to the castle (Fig. 75).[2]

Also associated with the medieval history of the area is the Varikkoniemi site, located opposite the castle on the shore of Lake Vanajavesi and the focus of considerable excavations in the past few years. Basing on the results of the excavations, Eeva-Liisa and Hans Peter Schulz have suggested that a large inhabited area or urban-type settlement existed at the site already in the Iron Age and that its later stages included the building of Hämeenlinna Castle. Critical comments, mainly by Jussi-Pekka Taavitsainen and Markus Hiekkanen, note that the main antiquities at the site are associated with its later history (mainly of the 18th and 19th centuries). The critical position maintains that there was small-scale settlement at the site already in the Iron Age, but no township or urban-type settlement (Fig. 68).[3]

The castle of Hämeenlinna consists at present of the main castle, an outer bailey and a moat surrounding the whole. The terms used of the various wall sections and tower in the outer bailey are given in a separate illustration.

It is also possible that the medieval sphere of influence of the castle already included the moraine hillock north of it, where the household ward may have been situated (Fig. 75).[4]

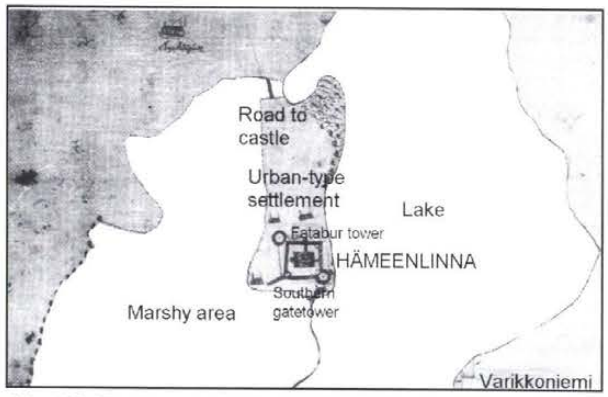

Fig. 75. Environs of Hämeenlinna Castle with reference to 17th-century cartographic material. (Kostet 1995, p. 45. Redrawn by K. Uotila)

7.1. History of Research

Studies on the architectural history of Hämeenlinna Castle began in 1869, when J. R. Aspelin focused attention on planned major alterations in the castle. He demanded that historical and archaeological studies be carried out there before any major alterations were undertaken.[5]

Around the turn of the nineteenth and twentieth centuries this research tradition was carried on by the archaeologist Julius Ailio. In 1901 Ailio published an article on the history of Hämeenlinna Castle and in 1917 a book on its prehistory and architectural history. Ailio suggested that the oldest stage had consisted of an outer bailey of masonry surrounding a main castle of timber.[6]

Juhani Rinne was the first scholar to discuss the parallels to Hämeenlinna Castle in various parts of the Baltic, and connections with the castles of the Teutonic Order in particular.[7] Concurring with him was Armin Tuulse, who clearly linked Hämeenlinna Castle with the castle architecture of the Teutonic Order.[8] In the 1950s, Carl Jacob Gardberg and Lars Pettersson treated the castle in their studies.[9]

The 1950s also marked the beginning of major repairs to the castle, one of the results of which was Knut Drake's dissertation from 1968 on the medieval architectural history of the castle.[10] Drake's study is the absolute foundation of all research on Hämeenlinna Castle.

Various interpretations have recently been presented, for example the suggestions regarding

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[1] The environs of Hämeenlinna Castle differ from other medieval castles in that the water level of the lake (Vanajavesi) has risen throughout the period the castle was in use. According to archaeological investigations of the nearby Varikkoniemi site, the surface of the lake was at + 80 metres a.s.l. around AD 400 and at +81 m a.s.l. around AD 1400 (Kankainen et al. 1992, p. 88; cf. Lovén 1996, p. 94). In the 17th and 18th centuries, the shoreline was at + 82 metres a.s.l (Katermaa 1992, p. 144).

[2] E.g. Gardberg 1993a, p. 52; Katermaa 1992, p. 129-150; Luppi 1996, p. 104; Masonen 1989, pp. 64-65; Pettersson 1958, p. 551.
On the oldest cartographic material on the town and castle of Hämeenlinna, see Kostet 1995, pp. 44-45; Lilius 1989, pp. 7-10; Ripatti & Laitila 1989, pp. 34-37.

[3] On research concerning Varikkoniemi, see; Kankainen et al. 1992, pp. 87-107; Lempiäinen 1992, pp. 109-128; Schulz E. & Schulz H. 1992, pp. 41-85. On comments on the Varikkoniemi research see e.g. Gardberg 1993a, p. 52 and Masonen 1989, p. 226, note 83. Critical view have been expressed for example in Drake 1996a, pp. 31-32; Lovén 1996, p. 96; Taavitsainen 1990, p. 166-167.

[4] E.g. Gardberg 1993a, pp. 61-62; Luppi 1992, p.2.

[5] Drake 1968, pp. 16-17.

[6] E.g. Ailio 1917, pp. 191-192. See Drake 1968, pp. 17-18.

[7] Rinne 1914, p. 284.

[8] Tuulse 1942, pp. 389 and 1952, p. 197; Tuulse 1957a, p. 123.

[9] Gardberg 1954; Pettersson 1955 and 1958. See Drake 1968, p. 19.

[10] Drake 1968.

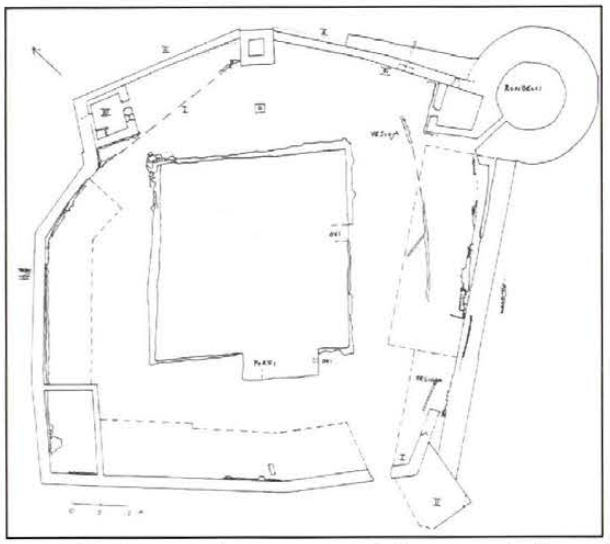

Fig. 76. Excavated structures of the outer bailey of Hämeenlinna Castle. (Luppi 1996, p. 109)

the age of the castle's oldest artefact finds presented in Jussi-Pekka Taavitsainen's doctoral dissertation. It is only obvious that analyses of the archaeological finds from the castle would provide a great deal of new information on the history and age of the castle.[1]

In November 1996 Drake presented and discussed the architectural history and age of Hämeenlinna Castle on the basis of results from the 1990s in an unpublished paper delivered at a seminar in Hämeenlinna Castle. According to him, the main castle was built in the order outlined in research conducted in the 1960s. The main difference with regard to earlier results is that the beginning of construction of the main castle was now dated to as late as the close of the 14th century and the brickwork castle dates from the 15th century. With regard to the outer bailey, Drake returned to Ailio's original suggestion that the outer bailey walls were the oldest brickwork part of the castle. According to Drake, these walls may date from the turn of the 13th and 14th centuries, whereby they would be associated with a source from 1311 referring to an attack by Novgorodian troops.[2]

Päivi Luppi, who worked as an archaeologist at Hämeenlinna Castle in the 1970s and '80s, has discussed the castle's history of construction from an archaeological perspective in a few articles.[3] In 1992 Luppi presented her graduate paper on the medieval outer bailey of Hämeenlinna Castle.[4] Basing on the results of this study, Luppi published an article on the subject in 1996.[5]

Mirja Kanerva, who worked as an architectural researcher in Hämeenlinna Castle in the 1970s and '80s, discusses the later stages of the outer bailey in a few articles.[6] Also involved with the castle is a group of historians of Tampere University, of whom Aino Katerma, Anna-Maria Vilkuna and Tuula Hockman in particular have studied the castle and its environs.[7] The most recent stage in the long series of research on the castle is a project launched in 1996 involving the National Board of Antiquities and several universities.[8]

7.2. The Research Material

The outer bailey of Hämeenlinna Castle has been discussed or, more precisely, touched upon in architectural histories at different times. For the most part it was not until the repairs and renovations of the 1970s and '80s that the structures of the outer bailey came under study. Field work was conducted by Mirja Kanerva and Päivi Luppi for several years. Unfortunately, part of the post-excavation work still remains to be done.[9]

No finished reports on the walls or excavation reports are available. There are only isolated observations of various structures and locations. The compiling and analysis of the data would no doubt provide a great deal of new information on the outer bailey at Hämeenlinna. This was not possible in connection with the present study, and it has been necessary to rely on the building-archaeological data observations and interpretations of other researchers (Fig. 76).[10]

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[1] Drake's dating of Hämeenlinna Castle has been critically discussed particularly in the 1990s. E.g. Gardberg 1993b, pp.120-123; Hiekkanen 1996, pp.55-56; Lovén 1996, pp. 94-97; Taavitsainen 1990, p. 231.

[2] Drake 1998.

[3] Luppi 1980 and 1985. A picture of the history of research of Hämeenlinna Castle is also provided by the statements of Elias Härö (director of research) and Päivi Luppi (researcher) at a research seminar held in 1992 (Hiekkanen 1992, pp. 16-17 and p. 22).

[4] Luppi 1992.

[5] Luppi 1996, pp. 104-121.

[6] Kanerva 1980; Kanerva 1984.

[7] On historical studies on Hämeenlinna Castle and its environs, see Hockman 1996, pp. 75-78; Katermaa 1992, pp. 129-150; Vilkuna 1990; Vilkuna 1996a, pp. 219-22 and Vilkuna 1996b, pp. 77-103 and Vilkuna 1998.

[8] During the academic year of 1996-1997 studies were in progress at Turku University on the Hämeenlinna Castle. It is thus possible that in the near future new features of the history of the castle will be revealed.

[9] On the state of research see Luppi 1992.

[10] E.g. Luppi 1980, 1985, 1992, 1996. See also Hiekkanen 1996, pp. 55-56 and Taavitsainen 1990, p. 231.

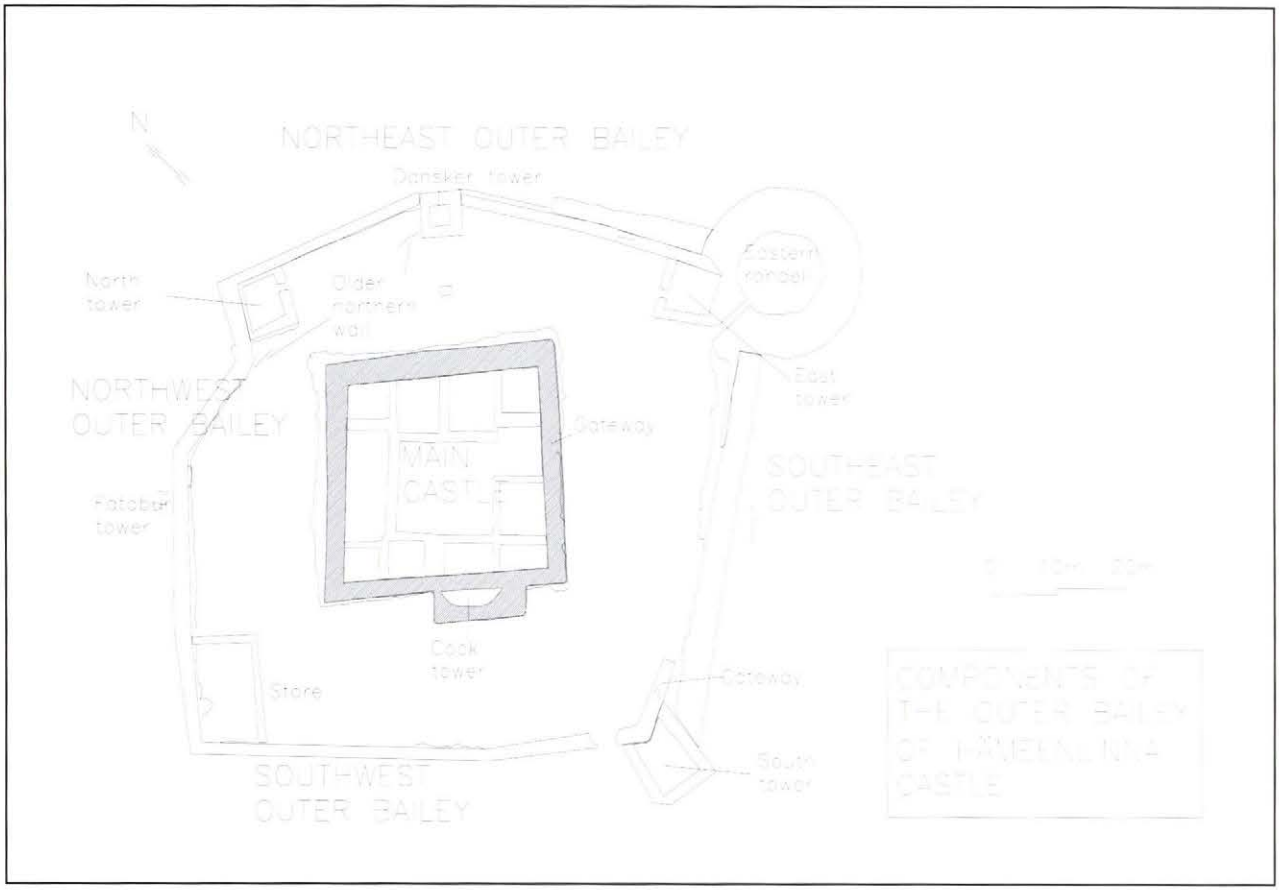

Fig. 77. Components of the outer bailey of Hämeenlinna Castle. (Luppi 1992 and 1996. Illustration by K. Uotila)

7.3. The Components of the Outer Bailey

Since Rinne's and Tuulse's research it has been maintained that the outer bailey of Hämeenlinna Castle is a Zwinger-type wall encircling the main castle on all sides, with a solely defensive function.[1] In sites like this the ward between the main castle and the outer bailey was, whenever possible, sharply contoured, whereby its shape was also part of the defensive system. Zwinger-type outer baileys of this kind initially had no buildings; the household economy of the castle operated completely within the walls of the main part. Apparently, narrow-shaped outer wards of this kind changed during the 16th century into household centres (Fig. 77).[2]

One of the underlying concepts of research is that the outer bailey was always built to guard access to the castle.[3] The entrance to the main castle was changed on several occasions during the 14th and 15th centuries, which has been regarded as one of the chronological criteria of the various components of the outer bailey. For example, access from the main castle and the outer bailey was via two bridges leading from the main castle to the Fatabur (Larder) and Dansker towers. In studies, the towers have been dated with respect to the construction of the doorways of their respective bridges in the main castle.[4]

[1] On the terminology based on the cardinal points, see Luppi 1996, p. 108. Cf. Drake 1968.

[2] E.g. Pettersson 1955, pp. 551-564 and Petterson 1958, pp. 424-425; Rinne 1914, p. 284; Tuulse 1942, p. 26 and 1952, pp. 196-197; Tuulse 1957a. On the construction of the 16th-century outer bailey, see e.g. Villkuna 1998, pp. 23-27.

[3] Reference to the need to protect the main gate in the dating of the outer bailey has been given an undue role in studies on the outer bailey of Hämeenlinna Castle. See Drake 1968, p. 162, Luppi 1992, pp. 47-48 and Luppi 1996, p. 113.
In the research literature, the defensive works of the main gate have generally not been regarded as a significant structural feature. The only exception is Juhani Rinne's conception of the western outer bailey of Turku Castle, which he claimed was built to protect the oldest, west, gate of the main castle. Rinne 1938, pp. 323-327.

[4] E.g. Luppi 1992, pp. 52-53 and Luppi 1996, 104-119.

7.3.1. The walls of the outer bailey

The oldest entrance to the main part of Hämeenlinna Castle was located in the southwest part behind the later main tower known as the "Cock Tower". It has been suggested that already for this entrance defensive works were built — in timber according to Drake and in stone according to Luppi. In the next stage in the 14th century the "Cock Tower", or the larger gate tower, was built. To protect this structure the outer bailey wall was built in the southeast and southwest parts of the castle.[1]

Building archaeological investigations have revealed a section of wall interpreted as the oldest building component. This section begins at the gateway in the southeast part of the outer bailey, continuing as a curving structure to form the southwest outer bailey wall and turning at a sharp angle to form the northwest wall, which in turn extends to the north corner of the main castle. From there it turns east and continues to the middle of the northeast outer bailey to the location where the Dansker tower was built at a later stage (Fig . 78).[2]

The respective order of construction of the older wall section and the Dansker tower is one of the most difficult details in the whole history of construction of Hämeenlinna Castle.[3] The oldest wall structure of the northeast outer bailey is dated to the 14th century and the Dansker tower to as later as the 1420s-50s, on the basis of the bridge leading to it from the main castle. Despite this, it was observed in the excavation that the oldest encircling wall and the Dansker tower were structurally joined to each other.[4] In terms of building archaeology, it is very difficult to imagine a construction process in which a section of wall and a tower would be structurally linked to each other with a hundred-year time span. It is of course possible that when the wall was built, the tower was also planned and for example binding stones or bricks for a later tower were already installet at that stage. However, carrying out such planned works decades later would have been highly exceptional. Without the tower, the side of the outer bailey facing Lake Vanajavesi would have remained without its strongest defensive element (Fig. 78).

The second area that is problematic for research is the southeast section of the outer bailey. Located here are a small section of wall and a structure linked to it that has been interpreted as the oldest gateway. The continuation of the wall from this point towards the southeast outer bailey is unclear. The continuation of the wall structure is suggested by the fact that it would be extremely unusual to build a gate at the very end of the wall without any connection to e.g. the walls of the main castle. Furthermore, the southeast outer bailey area includes a wall structure and associated components that may be related to the oldest wall structure (Fig. 78).[5]

The interpretation of the various components is greatly hindered by the fact that there is no topographic plan or map of the area that would tell why the outer bailey wall was originally lacking on the east side of the main castle.[6] The steeply sloping topography of the area is indicated in random observations[7], but it is uncertain whether it actually served as part of the castle's defence system without any kind of the breastwork.[8]

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[1] Drake 1985a, pp. 44-45 and Luppi 1996, p. 113.

[2] Luppi 1993, pp. 13-21 and 46-47; Luppi 1996, pp. 108-117.

[3] A further feature of the respective order of the structures is the fact that the foundation of the wall was built at an elevation of +83.10-83.40 m a.s.l. and the brick part of the Dansker tower at an elevation of +82.00-82.20 m a.s.l. Photographs show that under the tower is a stone foundation at least half a metre thick, i.e. at elevation +81.50 m. (Luppi 1992, pp. 14-21, fig. 6). It appears that the foundation of the later tower was built clearly deeper than the wall.

[4] E.g. Luppi 1992, pp. 46-47 and 1996, pp .108-112. Luppi refers to Drake's study of the history of the main castle (e.g. Drake 1968, pp. 99 and 124). At this stage Drake did not yet have any information on the Dansker tower and he linked the doorway of the main castle to a privy. Drake 1968, pp. 114-115 and abb. 100. See Lovén 1996, p. 95.

[5] Luppi 1992, pp. 22-28 and Luppi 1996, pp. 112-114.

[6] In his study, Lovén presents a sketch of the contours of the terrain of Hämeenlinna Castle. The original source is not given, and the map is interpolated. The marking "+15" most probably refers to elevation +96.00 m a.s.l. Lovén 1996, p. 94.
The map was probably drawn from a reconstruction by Drake, but the results of excavations in the outer bailey were not yet available in the 1960s. Drake 1968, p. 164. In both drawings up to three metres of earth have been removed in places from the present ground level of Hämeenlinna Castle (for example in the southeast gate tower area), but in the northwest outer bailey both drawings follow present-day elevation contours. Also in the northeast outer bailey the surface as given in the map does not correspond to the excavation data (see Luppi 1992, pp. 13-21). We can thus argue that both drawings contain obvious generalizations and they cannot be the basis for any final conclusions regarding the original topography of the castle. On the present-day topography of the castle: Town-plan map of the castle area in the archives of the Survey Department of the City of Hämeenlinna.

[7] The original topography may have had very steep and abrupt contours. The inner face of the foundation of the wall linking the Dansker tower and the round tower is at elevation +87.35-87.70 m a.s.l. and the outer face is at +81.30 m a.s.l., which means that the original moraine base sinks some six metres over a section of two metres. It is very rare for a wall to be built on so steep a slope (Luppi 1992, p. 16).

[8] There is no map or plan showing the areas of the outer bailey ward that have been excavated, and it is thus impossible to know what areas have been investigated and to what depth. Therefore, we cannot know definitely whether or not all the wall sections under ground level have been excavated.

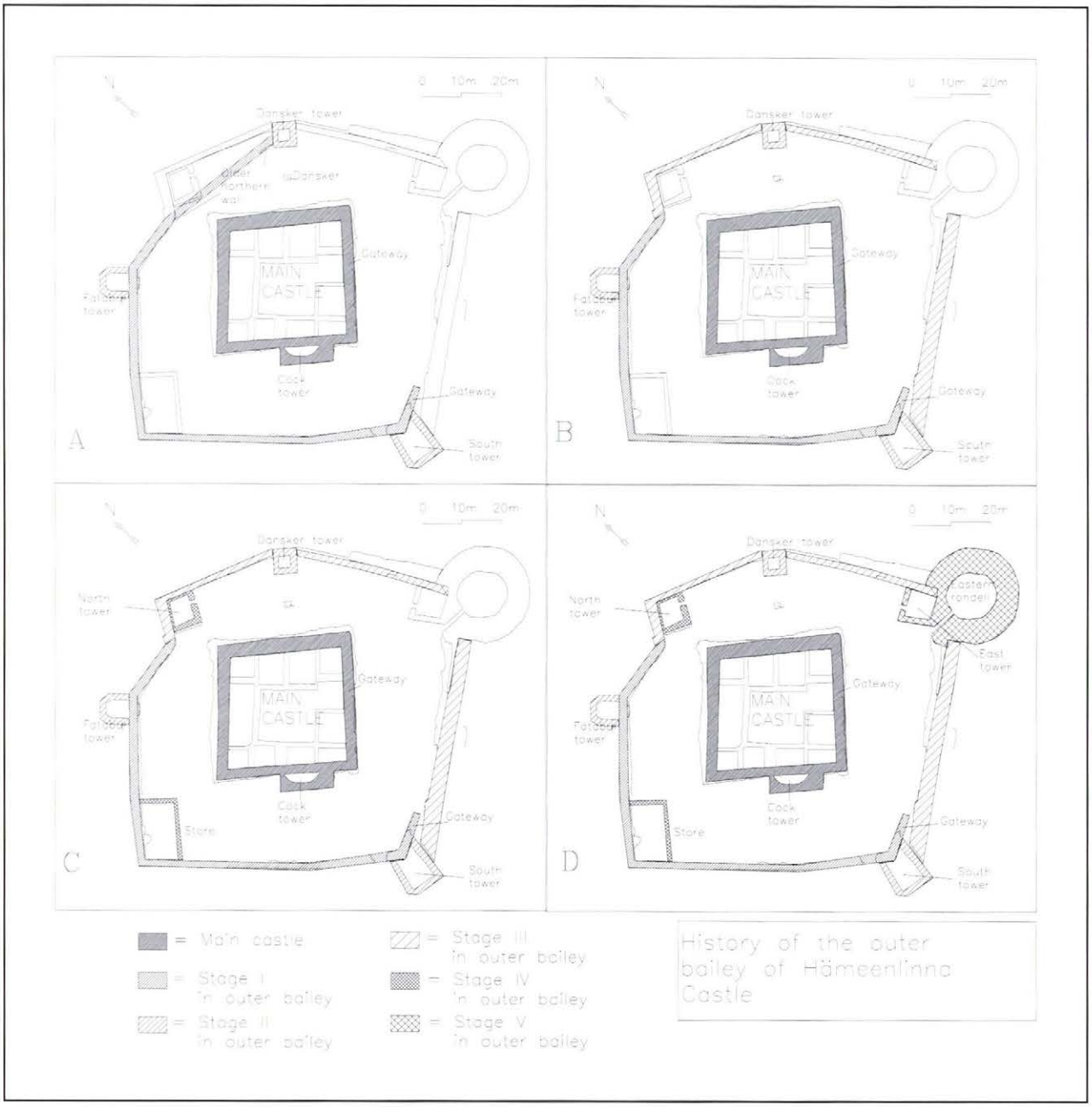

Fig. 78. Architectural history of the outer bailey of Hämeenlinna Castle according to research by Drake (in 1960s) and Luppi. (Drawing by K. Uotila)

I feel it is possible that when the castle came to have a Zwinger-type defensive bailey based on German examples, the outer bailey walls extended to the bailey's southeast and east ends already during the first stage of construction. It may have resembled more the castles of the Teutonic Order in the Baltic countries and areas south of the Baltic, where the Zwinger-type bailey was generally built in a single stage.[1]

In the oldest stage of the outer bailey, the apparently only gateway was at the south corner. Anyone approaching the castle along the moraine ridge from the northwest could be watched for a long section beginning at the walls of the southwest outer bailey. Both within and outside the wall on the northeast side of the oldest gate structure are components that do not belong to the present structures. They may be associated with a tower that stood at the site in the early stage, or with some other yet unidentified stone structure.

[1] On the castles of the Teutonic Order, see e.g. Alttoa 1993, pp. 11-16; Biller 1998, pp. 204-205; Dubovik 1993, pp. 38-44; Krahe 1994, pp. 692-715; Krassowski 1990, pp. 285-290; Pospieszny 1993, pp. 169-176; Tuulse 1942, pp. 73-94, 166-181; Tuulse 1952, pp. 178-179.

The oldest sections of the wall still survive in the southwest and northwest walls of the outer bailey. Investigations have revealed no indications that the walls had been raised in the Middle Ages. With reference to other medieval castles, it could be assumed that the walls were raised in height at the same rate as the main castle. Accordingly, the originally 11-metre-high walls would have fronted most of the main castle, which was not in accordance with the medieval Zwinger concept.[1] It is thus possible that also the outer bailey walls of Hämeenlinna Castle were built in several stages.

In summary,it can be noted that according to Drake's and Luppi's studies the oldest outer bailey walls are on the southwest side of the main castle and are dated to the 14th century on the basis of the need to protect the gateways. Also the other sections of the oldest wall are of the same age. With reference to the large number of bricks used, Luppi specifies the dating of the walls to the close of the 14th century[2]. (Fig. 78)

In Drake's and Luppi's studies the oldest outer bailey walls are on the southwest side of the main castle and are dated to the 14th century on the basis of the need to protect the gateways. Also the other sections of the oldest wall are of the same age. With reference to the large number of bricks used, Luppi specifies the dating of the walls to the close of the 14th century[3].

7.3.2. The outer bailey towers

During the 15th century, the south tower was added to the south corner of the outer bailey. Originally, it was probably rectangular and the present bevel-cornered shape dates from later construction work. In connection with the construction of the gate tower, the older gateway was walled up.[4]

A square Fatabur tower with bevelled corners was built outside the northwest wall of the outer bailey. With reference to the bridge leading from the main castle, the tower has been dated to the early 15th century. The coat-of-arms of the Tott family associated with the tower dates it to the turn of the 15th and 16th centuries.[5]

The third tower of the outer bailey is the Dansker tower in the northeast outer bailey.[6] The older wall structure definite extends to it, but there are signs that the wall continued on the southeast side of the tower. The Dansker tower measures 6 x 6 metres, and its walls average 1.5 metres in thickness. Beginning at elevation +82.00 m a.s.l. on top of the stone foundation is a brick structure of monk bond. In the main castle the doorway of the bridge leading to the tower is at +99.40 m a.s.l. Even if the bridge had been inclined, the tower would nevertheless have been very high, as much as 16 metres according to Luppi. Basing on the bridge leading to the tower, Luppi dates the construction of the tower to the years 1420-1450 (Fig. 78).[7]

I would nevertheless suggest the possibility that the tower was originally lower and it was raised at the same rate to its considerable late-medieval height. This would, however, greatly diminish the chronological role of the doorway leading to the bridge.[8]

7.3.3. Alterations to the outer bailey

The oldest walls of the northeast outer bailey were torn down and the new wall was built in a rectangular configuration corresponding to the shape of the main castle and extending from the

[1] An example of a low Zwinger-type wall is Marienburg Castle. E.g. Biller 1998, pp. 204-205; Krassowski 1990, pp. 287-288 and fig 294-296; Tuulse 1952, p. 179.

[2] Luppi 1992, p. 52.

[3] Luppi 1992, p. 52.

[4] Luppi 1992, pp. 22-28.

[5] On the Fatabur tower and the age of its Tott coat-of-arms, see e.g. Drake 1968, pp. 163-164; Gardberg 1993a, pp. 58-61; Härö 1997, p. 38; Luppi 1992, p. 50 and Luppi 1996, p. 117; Pettersson 1981, p. 219.

[6] The foundation of the tower is at a very low elevation (ca. +81.50 m). The lowest parts of the northeast ring wall are also at ca. +81.30 m a.s.l. According to studies, water level at the site was at +81.00 m a.s.l. in AD 1400, which means that the walls and the tower were built right at the waterline (Kankainen et al. 1992, p. 88). It is possible that the foundation of the tower and the whole northeast section of the wall were later inundated by the rising waters of the lake. Water level was around +82.00 m a.s.l. in the 17th and 18th centuries (Katermaa 1992, p. 144). Even slowly rising water levels would suggest that the Dansker tower and the wall of the northeast outer bailey would date to the beginning of the 15th century, perhaps already to the 14th century.

[7] Luppi 1992, pp. 14-21 and 47. See Drake 1968, pp. 99 and 124. There may be problems involved with using the doorways of the main castle for dating purposes, because also later dates have been suggested for the brickwork stages of the main castle. E.g. Hiekkanen 1996, pp. 55-56.

[8] Dansker towers standing apart from the main castle are typical features of the castles of the Teutonic Order. In most cases, however, they are not in the same defensive line as the outer bailey walls, but have been built apart from the other components of the castle. Assuming that the Dansker tower of Hämeenlinna Castle corresponds to the example of the Teutonic Order, it is possible that here, too, the tower was originally built apart from the rest of the castle and outer bailey (E.g. Krahe 1994, pp. 703, 704, 708, 710, 713; Krassowski 1990, figs 292-294; Tuulse 1942, p. 153). Of the castles of the Teutonic Order, only Strassburg (Pol. Brodnica) has a Dansker tower directly joining the outer bailey wall (Krahe 1994, p. 712).

north corner to the Dansker tower and diagonally to the southeast. This stage is dated to the 15th century.[1] The present outer bailey walls were built in the southeast outer bailey. The course of the walls was altered, and the old walls were most probably torn down. This second wall stage is dated to the end of the 14th century or the beginning of the following century.

After the renovation of the northeast and southeast sections of wall, this outer bailey formed an integrated whole, a veritable Zwinger -type defensive arrangement, which appears to date from the 15th century, and more precisely from the stage following the Dansker tower, i.e. after the 1420s-50s (Fig. 78).[2]

The last medieval works involved the construction of the north ring-wall tower. Its structures resemble those of the west and north corner towers of the main castle and it is dated to the turn of the 15th and 16th centuries, possibly to as late as ca. 1520.[3] Gardberg links the construction of the north tower with references in a source from 1539 to the construction of a cannon tower.[4]

7.4. Summary

The history of construction of the outer bailey of Hämeenlinna Castle is in many respects still uninvestigated. In the light of present data , it is very difficult to combine the development of the various parts of the outer bailey area into a coherent whole. Obviously, a careful survey of the available archaeological material would definitely clarify many issues.

According to Luppi (and formerly Drake as well) the construction of the outer bailey began in the area southwest of the main castle, continuing from there to the northwest and north outer baileys already during the 14th century. It is also possible that the southeast outer bailey initially had a diagonal wall, which was replaced by the present wall of the southeast outer bailey already at the turn of the 14th and 15th centuries. During the 15th century, perhaps during its second half, the northeast outer bailey was enlarged and new walls were built, after which the whole main castle was surrounded by an outer bailey of masonry. This course of development assumedly lasted at least a hundred years, perhaps longer.

At Hämeenlinna Castle, the outer bailey towers are younger components than the walls, which means that in this respect it differs from most other medieval castles in Finland. The south gate tower was built in the 15th century, the Dansker tower in the 1420s-50s and the Fatabur tower in the early 15th century. The north ring wall tower dates from the early 16th century.

The dating and history of construction of the outer bailey of Hämeenlinna Castle entails a number of difficult problems, the first of which is the overall chronological framework, which is based solely on the architectural dating of the main castle.[5] Since the 1960s, Drake's conception of the stages and age of the main castle has been accepted in the research literature. On the other hand, even a partial analysis of the archaeological data has shed doubts on the proposed chronology.[6] It can also be assumed that the outer bailey will produce archaeological material as a basis for dating, but this material has not yet been used.

A further problem of the construction of the outer bailey is the planned nature and duration of building work in the past. Ever since Rinne's and Tuulse's studies, the outer bailey has been regarded as a Zwinger-type defensive structure. The various sections of wall and particularly the missing sections indicate that a uniform outer bailey was not built until approximately a century after construction had commenced. This cannot be regarded as a very typical manner of constructing an outer bailey for defence purposes. Parallels in the Baltic regions suggest the more likely possibility that the outer bailey was built in a relatively shortely time and in a planned manner.[7]

An exceptional feature is the method of construction of the outer bailey walls and towers; archaeological investigations show that, for example, the towers were built in a single stage. It

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[1] Luppi 1996, pp. 112-114.
[2] Luppi 1992, pp. 36-53.
[3] Drake 1968, p. 162 and Luppi 1992, p. 47.
[4] Gardberg 1993a, p. 61.

[5] Drake's later suggestion that the construction stages of the main castle should be dated one hundred years younger and that the outer bailey walls are the youngest component of the castle as a whole completely disrupt Luppi's chronological framework (Paper delivered by Drake at Hämeenlinna Castle on November 22, 1996. See Drake 1997a and Drake 1998.).
[6] Discussion of the oldest coin finds from Hämeenlinna Castle. E.g. Taavitsainen 1990, p. 231 and Lovén 1996, p. 96, note 4.
[7] The assumedly extremely long period of construction of the outer bailey has been placed in new light by Drake's recent dating of the main castle (Drake 1998).
According to him the Main Tower ("Cock Tower") was not built until the early 15th century and the brickwork castle in the second half of the 15th century. Assuming still that the outer bailey is a Zwinger-type structure (contrary to Drake's suggestion), it would be from as late as the 15th century and its construction would not have lasted more than only a few decades.

is possible that the original wall face can be found only in places and no thorough analysis can be made. The medieval height of the outer bailey walls and towers are suggested by only a few structural details and 17th-century plans and drawings. They may also point to the late-medieval or 16th-century raising of the walls, of which there are indirect indications in the walls of the northeast outer bailey. One of the special features of studies on the outer bailey of Hämeenlinna Castle is the use of abundant cartographic and pictorial material outlining the stages of construction. According to Luppi, this 17th- and 18th-century material indicates the form and configuration of the medieval castle[1], although documentary sources tell that alterations and repairs were carried out in the castle throughout the centuries[2]. Therefore it is possible - as at Turku Castle - that the shape, size and height of the castle walls were altered during the 16th and 17th centuries and that the oldest available illustrations present an outer bailey that had renovated on many occasions, and not the original medieval castle.

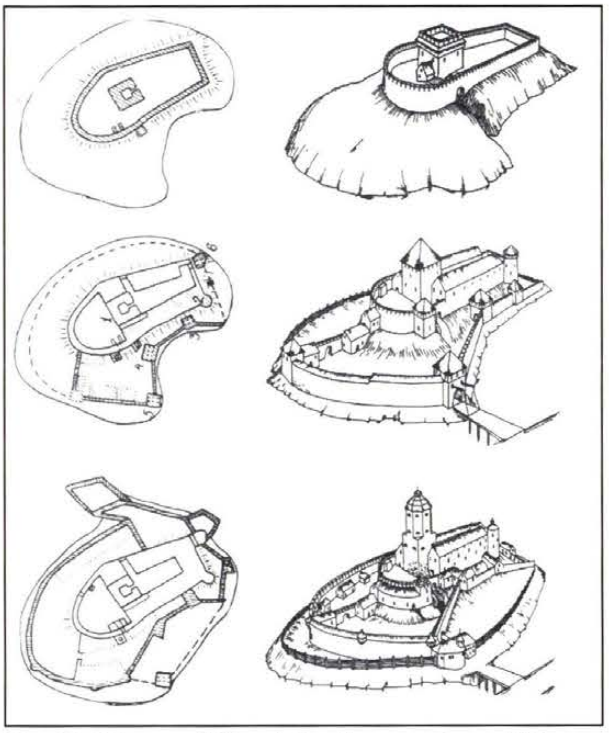

Fig. 79. History of Viipuri Castle according to V.A. Tyulenev.
A = Oldest construction stage 1293-1322
B = Construction 1442-1499.
C = Construction 1559-1623
(Tjulenew 1983, p. 80 and 1995, figs. 6, 11, 12.)

8. VIIPURI CASTLE

8.1. History of Research

The first studies and investigations were conducted at Viipuri Castle in the 19th century. (Figs. 79, 80) Extensive repairs carried out by the Russians in the late 1800s succeeded in destroying large parts of the medieval castle.[3] There is no overview of the Finnish research work carried out in the castle prior to 1944, when Viipuri was ceded to the Soviet Union. [4] An established position in interpretations of architectural history was enjoyed by the Russian researcher Wjatcheslaw Tjulenew, who conducted excavations in the castle area in the 1980s. (Fig. 79). He has presented his results in a few articles, and they were widely accepted in Finland in the early 1990s.[5]

In the early 1990s, the Russians had to repair the so-called "Paradise Tower" standing at the southeast corner of the main castle. At this stage, extensive — mainly technical — investigations were conducted in the tower and its environs. These included Finnish building experts, but no

[1] E.g. Luppi 1996, pp. 118-119.
[2] E.g. Vilkuna 1996b, pp. 77-103.
[3] The history of Viipuri Castle was first investigated in the late 1880s, when field work there was conducted by Alfred Hackman. His research was published in 1944 (Hackman 1944). An overview of the various component of Viipuri Castle is provided by surviving cartographic and pictorial material (e.g. Kauppi & Miltšik 1993).
For example the wall of the so-called smithy ward was almost as high as the main castle in the early 18th century. The tower flanking the south part of the smithy ward can also be seen in surviving maps (Kauppi & Miltšik 1993, p. 35, fig. 22).

[4] In 1928 an extensive guidebook to Viipuri Castle was published, largely corresponding to Hackman's views of its history (Raekallio 1928).
[5] Tjulenew 1983, pp. 79-86. Tjulenew 1995. On the views of Finnish researchers, see Gardberg 1993a, p. 66 and Uino 1997 pp. 345-346.

Fig. 80. Viipuri Castle (Sw. Viborg).
The early stages of Viipuri castle are associated with the so-called third Swedish crusade into Finland in 1293. In the 1440s Karl Knutsson (Bonde) held court at the castle and from 1457 to 1480 the commandant was Erik Axelsson (Tott). Heated battles were fought at Viipuri in 1495, and in 1523 the castle fell into the hands of Gustavus Vasa. In 1710 Viipuri was taken by the troops of Peter the Great. The castle was severely damaged and in 1887 the first investigations there were begun, after which it was converted into barracks and the medieval sections were mostly destroyed. View from the northwest. (Photo P.O. Welin)

experts in building-archaeology.[6] During the past few years, Knut Drake has in various connections presented hitherto different views of the history of Viipuri Castle. His views are based on field observations of the 1990s concerning the order of construction of the main castle and the tower of St. Olaf .[2]

[1] Parland 1994.

[2] Drake 1992a, pp. 52-53 and 1996c. On critical assessments of Tjulenew's results, see also Lovén 1996, pp. 97-99.

8.2. The Construction of the Outer Bailey of Viipuri Castle

With regard to the outer bailey of Viipuri Castle Tjulenew has suggested that an old Karelian fortress at the site was converted into a masonry castle after the conquest of Karelia in 1293 by the Swedes. At this stage the main castle included the tower of St. Olaf with the main part facing the south. Already at this stage, the so-called smithy ward or first outer bailey was built northwest of the tower. This structure assumedly dates from the beginning of the 14th century at the latest . During the 15th century (1442-1499) the construction of the outer bailey extended to the south and west of the castle, where a large outer bailey was built. It is also assumed that at this stage there was a defensive work of timber to the north and east of the castle. During the third stage in the 16th and 17th centuries (1559-1623) part of the western outer bailey was demolished and a new outer bailey was built to the east and north of the castle (Fig. 74).[1]

Drake's comments on the history of construction and Tjulenew's excavation methods, which appear to be cavalier in an archaeological perspective, for example in the area of the Dominican Convent, make it necessary to take a critical view also of the suggested history of construction of the outer bailey.[2]

Drake's new suggestions regarding the history of Viipuri Castle also touch upon the construction of the outer bailey. According to him, the oldest parts of the whole castle were the walls of the so-called smithy ward, dating to the events of 1293. These were followed during the 14th century by a rectangular main castle, leaving the smithy ward as the outer bailey. Around the year 1400 the tower of St. Olaf was built in the middle of the northwest wall, at which stage Viipuri Castle still had no western outer bailey.[3] In 1985 Drake had suggested that in the 15th century - more precisely in the 1440s during the term of Karl Knutsson Bonde - the lower castle (Zwinger) was built, originally including five towers, one of which was a gate tower to the bridge leading to the castle.[4]

In his studies of the medieval castles of Finland, Carl Jacob Gardberg has largely agreed with Tjulenew's suggestions regarding the history of Viipuri Castle. With reference to the outer baileys, Gardberg dates the walls encircling the whole castle island of Viipuri and the annex, or wing, structures to the second half of the 15th century, the term of Erik Akselsson. At that stage, the outer bailey had a total of seven towers, whose shape and form is no longer known.[5]

8.3 Summary

Owing to the present state of research concerning Viipuri Castle, it is difficult to suggest anything definite about the history of the outer baileys. The stages of construction suggested by Tyulenev for the main castle and the smithy ward are proving to be mistaken and therefore we must also take a critical view of the suggested history of the outer bailey. Moreover, the course of development proposed by Tjulenew, whereby only the western section of the outer bailey was built in the 15th century seems to be a special conclusion requiring actual research and investigations to support it. On the other hand, Drake's recent conclusions mainly concern the main castle and the smithy ward, which means that the new history of construction of the actual outer bailey must remain open. With regard to the smithy ward, we must note that this was not a component of the castle originally planned as the outer bailey, but part of an earlier fortification, which later became the outer bailey. According to Drake's previous views, the outer bailey of Viipuri Castle dates from the 1440s, and Gardberg dates the whole outer bailey and its walls and wings to the second half of the 15th century, although some of the walls may be older.

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[1] Tjulenew 1983, pp. 79-86; Tjulenew 1995.
According to Hackman's conceptions of the 1880s, the construction of the southern outer bailey had already begun in the mid-14th century (Hackman 1944, pp. 44-55, pp. 104-105).

[2] The history of the outer bailey has also been commented on by Lovén. Lovén 1996, pp 97-99.

[3] Drake 1992a, pp. 52-53; 1996c and 1996d.

[4] Drake 1985a, pp. 62-63.

[5] E.g. Gardberg 1993a, pp. 68-71. Cf. Hackman 1944, pp. 60-62.

9. RAASEPORI

The castle of Raasepori is situated on the Raasepori River in the present town of Tammisaari in western Uusimaa province. The castle complex consists of a grey stone main castle, three outer baileys, Tallisaari Island next to the castle and a hillock slightly further afield which has traditionally been regarded as the site of the castle borough. The medieval and 16th-century history of the castle includes a few historical sources referring to the town of Raasepori, mentioned for example in 1550 (Fig. 81).[1]

9.1. History of Research

Research into the history of Raasepori Castle came under way in the 1850s, and the first repairs and investigations were conducted in the 1890s under the direction of Schjerfbeck, with whose conclusions Torsten Hartman concurred. Hartman suggested that a round tower, dating to the 1400-1500s, belonged to the first stage of the castle. In the second stage of construction, wings and an eastern outer bailey were added to the castle. This stage is dated to the turn of the 14th and 15th centuries.[2] In 1905, Julius Ailio wrote on the early history of the castle, dating the first stage of construction to the close of the 14th century.[3] In the 1930s repairs to Raasepori Castle were organized by Iikka Kronqvist and field work was conducted by Toivo Anttila.[4] Indirect evidence suggests, however, that also Kronqvist interpreted the round tower as the oldest stage of the castle, which he dates to as early as the close of the 13th century. In later years, Armin Tuulse and Lars Pettersson have concurred with Kronqvist.[5]

The most recent stage of research is work by Knut Drake. In several articles on Raasepori and a guide book to the castle, Drake presents a new interpretation of its history. According to him, the oldest stage (ca. 1370-early 1400s) consisted of the horseshoe-shaped main castle and the low east and west wings. In the second stage, (mid-15th century), the wings were raised in height and the eastern outer bailey was built. It was not until the third stage (ca. 1470-1550) that the palatial section in the south part and the round tower were built.[6] Carl Jacob Gardberg, who most recently treated the history of the castle in 1993 largely accepts Drake's historical outline, although he has presented more precise ages for the various components of the castle.[7]

The history of repairs and renovations at Raasepori is discussed in Kaarina Rissanen's 1978 thesis in art history.[8] Basing on the archival material of the NBA and Rissanen's studies, one can see that Raasepori presents a number of opportunities for archaeological research. In terms of objects and artefacts, the only available date is Drake's suggestion of dating the oldest coins from Raasepori to the second half of the 14th century, which is based on an oral communication by Pekka Sarvas.[9] In the 1980s repairs were carried out in the castle area and in conjunction with them investigations of some kind were conducted. The research material, however, is either difficult to access or has completely disappeared.[10]

Since the 19th century, research concerning Raasepori has included investigations of the nearby palisades, which have long been visible above ground level. Harry Alopaeus, who has extensively studied the palisades of medieval castles, has discussed the palisades of Raasepori in several papers and articles, of which the most extensive appeared in 1984. With reference to radiocarbon ages, Alopaeus dates the palisade structure to the 15th and 16th centuries. A dendrochronological analysis was later made of the palisade, indicating that at least the north section of the palisade dates from the winter of 1426/1427.[11]

9.2.The Components of the Outer Bailey

The main castle of Raasepori is situated on a high hill of bedrock where the west and north faces are almost perpendicular. To the east and south, however, the surrounding terrain is sandy/clayey

[1] E.g. Drake 1995 and Gardberg 1993a.
[2] E.g. Hartman 1896, pp. 115-118 and Drake 1991, pp. 127-128.
[3] Ailio 1905.
[4] Drake 1991, p. 139; Rissanen 1978, p. 34. Kronqvist never published any of his work on Raasepori.
[5] Pettersson 1958, pp. 427-428; Tuulse 1952, p. 196; On the earlier history of research, see also Drake 1988, p. 124 and Drake 1991, p. 128
The general history of Raasepori Castle is discussed in Henry Rask's history of Snappertuna parish (Rask 1991).

[6] Drake 1982, Drake 1988, Drake 1991 and Drake 1995. On the dating of the various stages of the castle, see Lovén 1996, p. 159.
[7] Gardberg 1993a, pp. 83-91.
[8] Rissanen 1978.
[9] Drake 1991, p. 91.
[10] Archives of the Department of Monuments and Sites, NBA/Raasepori.
[11] Zetterberg 1992.

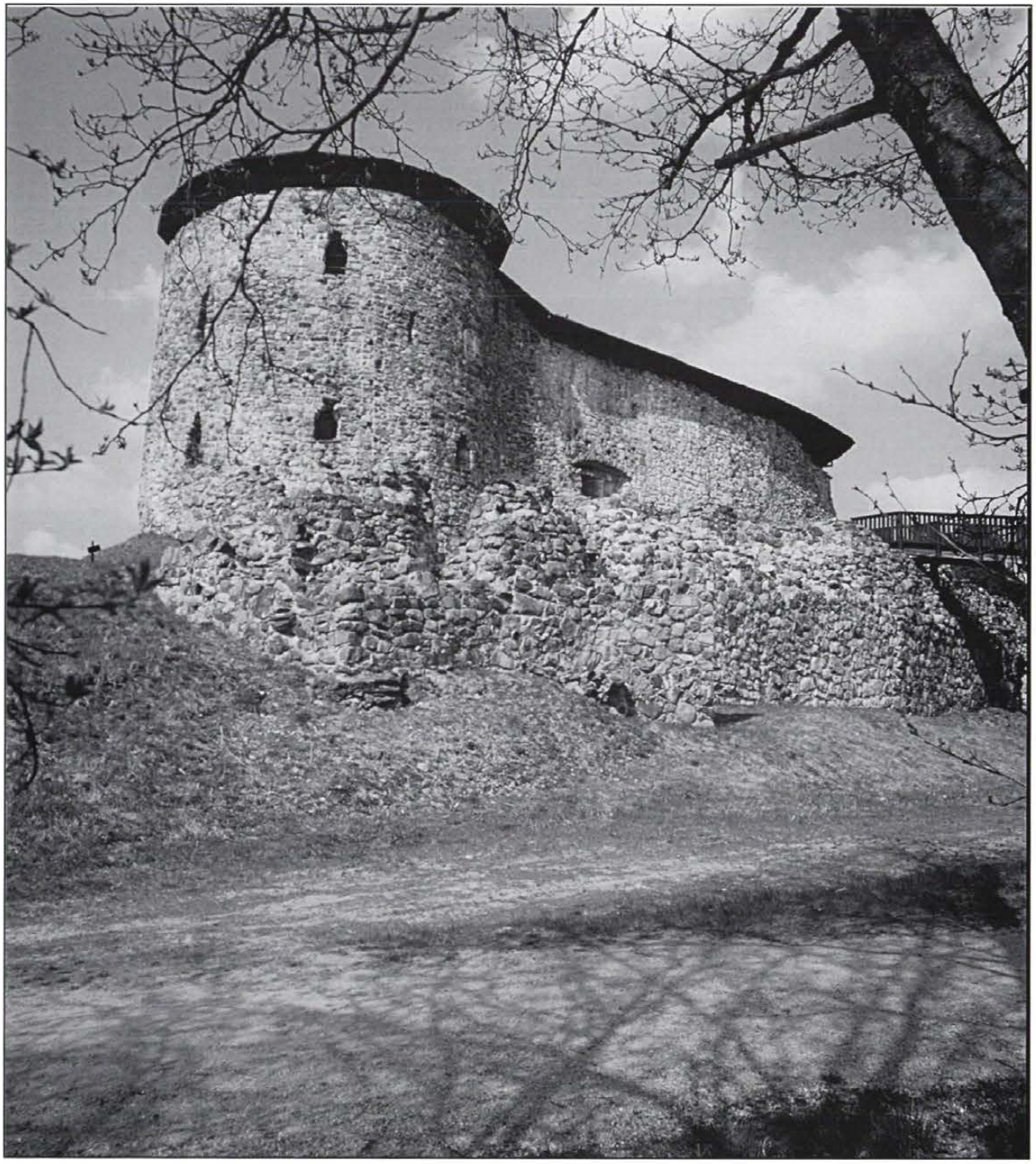

Fig. 81. Raasepori (Sw. Raseborg).
Raasepori castle is mentioned for the first time in sources in 1378 and its outer bailey in 1427. In the 1465-67 Karl Knutsson (Bonde) held a sumptuous royal court at Raasepori and from 1468 until 1483 its castellan was Lars Axelsson (Tott). Along with Finland's other castles it passed into the hands of Gustavus Vasa in 1523. Raasepori took on a secondary role as administration began to focus on the town of Helsinki founded in 1550, and the castle was finally abandoned in 1553. Investigations of the ruined castle began in 1889. View from the southeast. (Photo P.O. Welin)

soil sloping more gently from the castle. On the east and south sides, the main castle is surrounded by three Zwinger-type outer baileys, which Drake[1] calls the east, southeast and south outer baileys. Rissanen's names for the structures differ, for in addition to the south outer bailey she also refers to a southeast and northeast outer bailey. The north-

[1] Drake 1991, pp. 114-119.

east structure corresponds to Drake' eastern outer bailey.[1]

In studies on the history of Raasepori, the outer baileys have, as is common, a secondary role. Already in 19th-century studies, the east outer bailey has been linked with the east gate tower of the main castle and its stage of construction.[2] The excavation of the outer bailey walls began in the early 20th century under the direction of Juhani Rinne. In later years, large volumes of earth were removed from the outer baileys, but they were not sufficiently investigated archaeologically (Fig. 82).[3]

9.2.1. The east outer bailey

The east outer bailey has generally been regarded as the oldest outer bailey structure. It is situated between the main castle and nearby *Tallisaari* island to protect the main castle and especially its gate tower in the eastern part. According to Drake, a separate tower — a kind of barbican — was already built in the initial stage of the castle (turn of the 14th and 15th centuries). During the second stage of construction (15th century) the east outer bailey, measuring ca. 35 x 35 metres, was linked to the renovated tower. Drake maintains that the outer bailey walls were built to their final height in the very beginning. There was no appreciable difference in the height of the walls of the outer bailey and the main castle; they extended to almost the same level. During the third stage (turn of the 15th and 16th centuries), the eastern outer bailey completely retained its earlier appearance and the height of its walls, although the main castle was clearly raised in height (Fig. 82).[4]

The only question clearly open to interpretation in connection with the east outer bailey is the height of the walls, which were assumedly almost as high as the main castle in the second construction stage. I would claim this to be doubtful, for medieval concepts of defence did not permit the walls of a narrow Zwinger-type outer bailey to be of almost the same height as the walls of the main castle. It can be assumed that also at Raasepori the walls of the outer bailey were raised as the main castle was raised, whereby they would not have reached the height suggested by Drake until the third stage of construction.

The relatively indefinite dating of the east outer bailey to the 15th century has been specified by Gardberg to ca. 1427. In that year the *lagman* assizes convened in the "outer bailey" of Raasepori Castle. According to Gardberg, this historical reference specifically concerns the east outer bailey, which was already finished at that stage. The palisade surrounding the castle and built in 1426 is possibly associated with this stage of construction.[5]

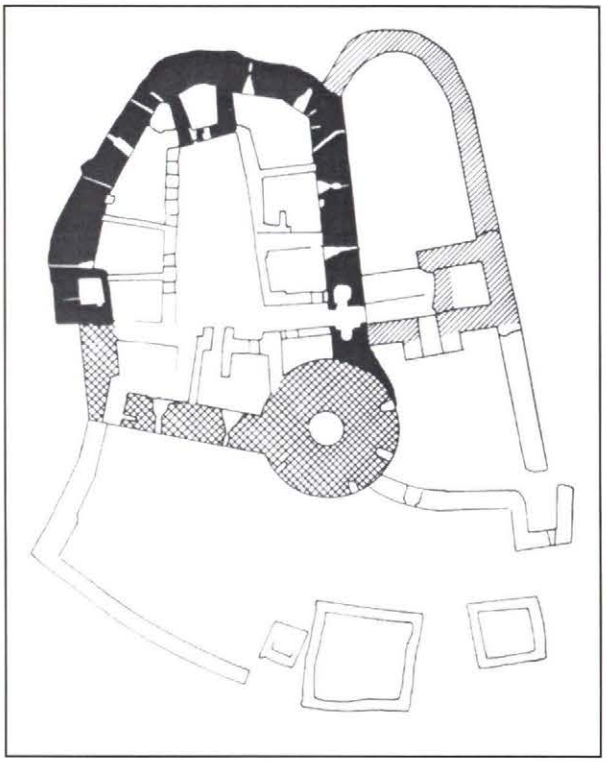

Fig. 82. Plan of Raasepori Castle and its medieval history of contruction according to Drake. Marked in black is the oldest main castle. The oldest outer bailey (the east one) are hatched and the southern palatial and round tower is cross-hatched. The later outer bailey section (in the southeast and in the south) are marked in white (Drake 1991, p. 130).

9.2.2. The southeast outer bailey

Drake maintains that in the second construction stage the main gate of the castle was on the southeast side and that a bridge led from *Tallisaari* island to this area. The apparently older southeast tower of the main castle sufficed for defensive purposes, because a small outer bailey (15 x 15 metres) was built only in the third construction stage. According to Drake, the outer bailey walls

[1] Rissanen 1978.
[2] Hartman 1896, pp. 115-118.
[3] Rissanen 1978, pp. 63-69.
[4] Drake 1991, pp. 114-116, 128-134. Cf. Lovén 1996, pp. 156-159.
[5] Gardberg 1993a, pp. 85-86. For a more precise dating of the palisade, see Zetterberg 1992.

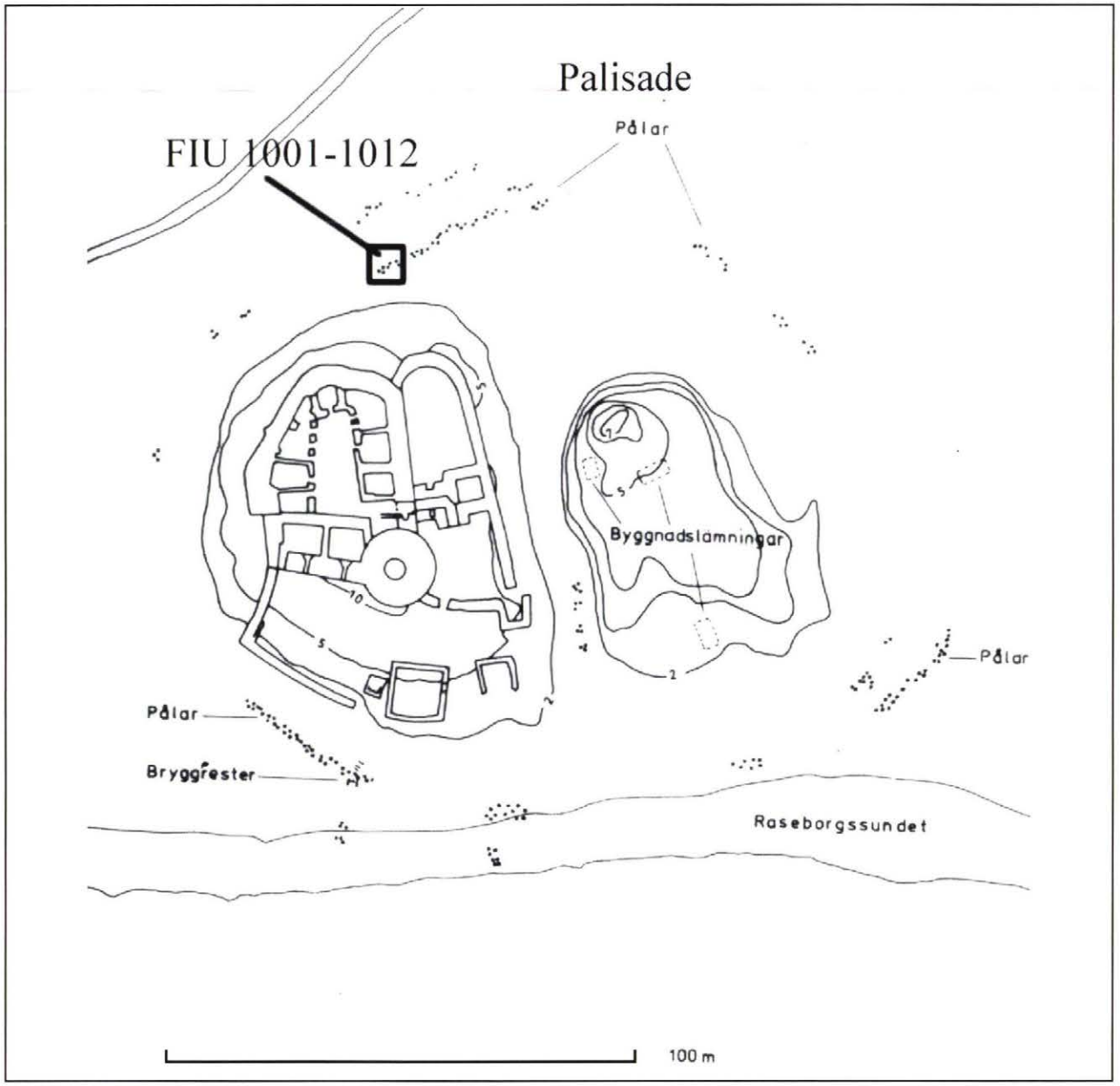

Fig. 83. The palisade of Raasepori Castle and dendrochronological datings FIU 1001-1012 (Drake 1991, p. 92 and Zetterberg 1992 p. 2).

are linked to the round tower of the late 15th century, and are thus dated to the third construction stage. The outer bailey included a tower protruding from the line of the wall at the southeast outer corner, and a gateway leading to the south outer bailey.[1]

Gardberg suggests a different interpretation in terms of structure and chronology, maintaining that the east outer bailey was enlarged as a Zwinger-type structure in front of the original gateway already during the period of Karl Knutsson, i.e. in the mid-15th century, at which stage the outer bailey was an older component than the round tower (Fig. 82).[2]

9.2.3. The south outer bailey

The south outer bailey (40 x 20 m) is generally regarded as the youngest component of the castle. One reason for this is no doubt because the wall structures of the south outer bailey are at elevations less than 2 metres a.s.l. Decades of repairs in the south outer bailey area have led to relocations of walls and the rediscovery of assumedly lost structures. In the southeast part of the outer bailey are the remains of two towers or stone structures, which are difficult to interpret because of their poor condition. Drake dates the south outer bailey to the third stage of the castle, i.e. to the turn of the 15th

[1] Drake 1991, pp. 116-117, 133-135.
[2] Gardberg 1993a, p.82.

and 16th centuries.[1] Gardberg concurs, dating the outer bailey to the 1470s-1480s (Fig. 82).[2]

9.3. The *Lagman* Assizes of 1427

The construction of the outer baileys at Raasepori probably began at the east outer bailey, built to protect the main castle from the direction of *Tallisaari* island and to secure the east main gateway. According to Drake, the east outer bailey dates from the 15th century; Gardberg has specified this date by pointing out that the outer bailey already existed in 1427 (February 3, 1427) when the assizes of the crown *lagman* convened at the castle[3].

It appears strange that the east outer bailey served as the venue of a large meeting such as the assizes, because even the diffuse archaeological material shows that the terrain of the east outer bailey formed a Zwinger-type defensive bailey sloping steeply to the wall. The ground level of the ward sank as much as four metres in an area slightly over ten metres wide. The archaeological material suggests that the ward was levelled while the castle was in use, but at this stage no specific dates can be given for the different elevations of the ward area.

The small and structureless outer bailey appears to be a strange place to hold the winter assizes (the surviving letters are dated February 3, 1427). It has been suggested that nearby *Tallisaari* island and its outer bailey was the possible site of the assizes.[4] It must be pointed out, however, that both *Tallisaari* and the remaining environs are still almost completely unexcavated and there is very little data on their fixed structures and age.[5]

9.4. The Palisade of Raasepori Castle

According to Harry Alopaeus, Raasepori Castle and *Tallisaari* are surrounded by a palisade of some 17,000 posts. This feature, however, has been marked only in places in published maps. Alopaeus and Drake date the palisade with reference to radiocarbon results, which according to them point to the 15th century.[6]

In 1992, Pentti Zetterberg studied year-ring samples from the palisade at Raasepori. According to his investigations, twelve samples were taken, of which eight pine samples are all from the winter of 1426/27, implying that the palisade was constructed perhaps already in 1427 or at any rate soon thereafter. Four of the samples are of spruce and could not be dated in the study.[7] All the dated samples of the palisade were from a limited area to the north of the castle, from the inner row of posts. Therefore, they cannot definitely date the structure as a whole, for example the part encircling *Tallisaari* (Fig. 83).

9.5. The Environs of the Castle and Shore Displacement in the area

The most detailed account of the medieval topography of the environs of Raasepori Castle is given in Alopaeus 1984. According to him, the rate of local land uplift is 3.6 mm/yr. Basing on this, he has drawn up a reconstruction of the area in 1550. According to him, sea level extended to the present two-metre a.s.l. contour, although following the given rate of uplift, the 1550 situation should be below 1.5 metres a.s.l. There is no mention in Alopaeus's text of any removal of secondary cultural layer in the reconstruction.[8]

In Drake's studies of 1991, the same two-metre contour is apparently used to described the assumed topography of the 14th century, which in view of mean land uplift appears to be a better reconstruction. There is, however, the problem that the 15th-century palisade is included in the illustration of the 14th-century topography.[9]

Both reconstructions also entail the problem that they have been drawn with reference to present topography at a site where considerable land-

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[1] Drake 1991, pp. 117-119, 133-135. See Lovén 1996, p. 159.
[2] Gardberg 1993a, pp. 87-
[3] FMU 1824. "i Raseborgs forborg"
[4] In Drake's 1995 guide to Raasepori is a reconstruction showing a wooden outer bailey at *Tallisaari* already in the late 14th century. Drake 1995, p. 28, p. 30 and p.31. Christian Lovén also refers to a wooden outer bailey at *Tallisaari*. Lovén 1996, p. 159.
[5] Drake 1991, pp. 121-124; Rissanen 1978, pp. 70-72. It is obvious that the household ward of Raasepori was at *Tallisaari* as also the borough, but so far there is insufficient archaeological data on this.
[6] Alopaeus 1984, pp. 84-89; Drake 1991, pp. 119-121; Gardberg 1993a, pp. 85-86.
[7] Zetterberg 1992. Christian Lovén takes a critical view of the suggested age and points to the possible replacement of the posts (Lovén 1996, p. 159). Zetterberg's investigation, however, dated eight pine samples, all of which were from the winter of 1426/27. The dendrochronological dates have also been accepted by Drake and Gardberg. See Drake 1995, p. 29 and Gardberg 1993a, pp. 85-86.
[8] Alopaeus 1984, pp. 84-89.
[9] Drake 1991, p. 92.

scaping and filling has been carried out already when the castle was in use and even more extensively in later years.[1]

Local shore displacement is an extremely important question in view of the construction of the outer baileys. The associated problems culminate in the west part of the south outer bailey, where the encircling wall was constructed at a location below the two-metre a.s.l. contour line. The wall structures in this area were investigated in the 1960s, at which stage it was noted that the alignment of the walls had been changed in earlier repairs and that there were underlying foundation posts only in parts of the structure. Rissanen's research clearly shows that the wall structures at Raasepori are open to many interpretations.[2]

9.6. Summary

The construction of the outer baileys at Raasepori possibly began before 1427 with the building of the east outer bailey, although it is difficult to link this structure with the recorded *lagman* assizes. At any rate a connection with the year 1427 is provided by the palisade. The east outer bailey is a typical narrow defensive bailey (Zwinger type), in which there is a steeply sloping ward area used for defence between the respective walls of the outer bailey and the main castle. With reference to historical sources, Gardberg concludes that the ward was also a venue for large gatherings. There is no archaeological evidence of the yard being used for dwelling or household purposes.

In the next stage during the 15th century, the gate structure of the east outer bailey was renewed and the southeast outer bailey was built. According to Gardberg, this structure is from the middle of the 15th century, and according to Drake from the second half of the century. Drake's main argument is that the southeast outer bailey was built adjacent to the round tower of the 1470s and is thus a later structure.

The last stage was the construction of the south outer bailey in front of the new palatial section on the south side. This was the latest addition to the outer baileys, and it dates from the close of the 15th century or the early 16th century. This dating is mainly based on the construction of the south part of the main castle during the second half of the 15th century, predating the outer bailey.

The construction of the outer baileys at Raasepori raised a few interesting questions. The first of these is whether the *lagman* assizes were really associated with the steeply sloping east outer bailey, or whether the considerably larger and gently sloping south outer bailey was actually in use at the time.[3]

This may also be suggested by the fact that the palisade encircling the whole castle can be dated to around 1427. The structure was built at the time as the outermost defensive works.

The construction of the outer baileys already in the early 15th century may also be associated with marked fluctuation in shore displacement in the area. There are no observations at Raasepori for example of walls at elevations which are too low.

A further question is associated with local shore displacement. It is possible that medieval sea levels did not recede at an even pace (e.g. 3.6 mm/yr at Raasepori) and there may have been considerable fluctuation. Review of such fluctuation and their results combined with the reconstructed topography of the area will definitely provide a different picture of the environs of Raasepori than the present reconstructions. Moreover, in view of the problematic south outer bailey, it can be suggested that it was built when sea levels were low in the 15th century and that structural problems did not set in until the water rose at the turn of the 15th and 16th centuries.

[1] I would claim that this is an important issue when treating the environs of a medieval castle, because ignoring the archaeological data when outlining the forms of the terrain undermines the whole credibility of the map or drawing.

[2] Rissanen 1978, pp. 64-65.

[3] On the use of *Tallisaari* island as the outer bailey of 1427, see e.g. Drake 1995, på. 28, 29, 30; Lovén 1996, p. 159.

10. KASTELHOLM

10.1. History of research

Research into the history of Kastelholm, the only medieval castle in the Åland Islands, already began in the 1850s and has continued since then with considerable activity at times (Fig. 85).[1]

A completely new stage of research began in the 1970s and 1980s when repairs to the castle began together with investigations of unprecedented scope in Finland.[2] Owing to the archaeological excavations and building-archaeological studies, Kastelholm can today be regarded as Finland's most thoroughly investigated castle. Already in the 1980s, the most recent scientific methods were applied, such as the radiocarbon dating of mortar and thermolumi-nescence dating of brick. A further, and highly commendable, feature of research on Kastelholm is the fact that the material and data of all the archaeological excavations until 1989 have been published.[3]

10.2. The various stages and chronology of the outer bailey of Kastelholm

Kastelholm Castle has traditionally been divided into the main castle and the outer bailey (Fig 84). The south section, i.e. the main castle, is smaller and the north part - the outer bailey - is larger.[4] In his 1993 study, Ronnie Carlsson calls the main castle the "south section" and the present outer bailey the "north section". A third section is the outer bailey that originally existed on the east side of the present castle and has originally almost completely disappeared.[5] Most of the outer bailey walls on the east side and the other structures are yet to be studied, or discovered, and they have played only a minor role in research on the architectural history of the castle.

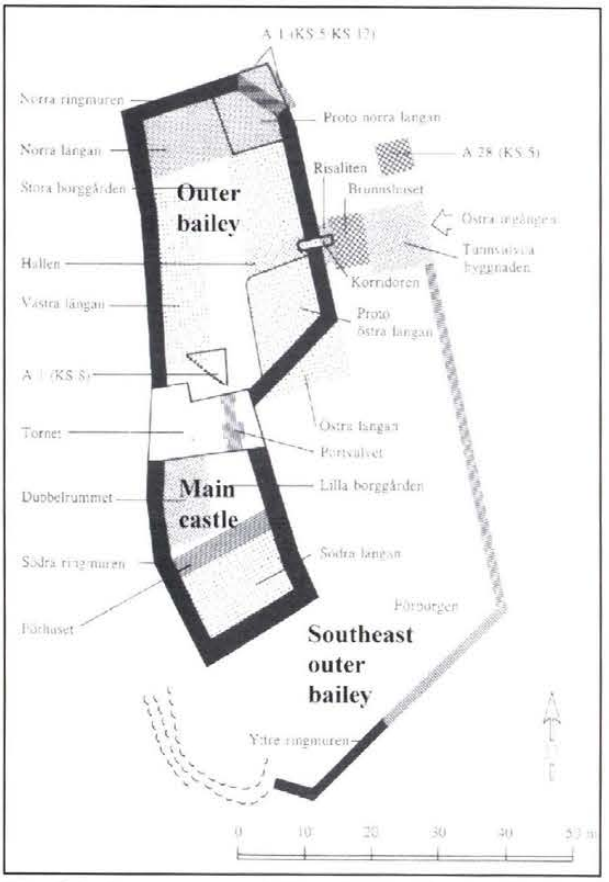

Fig 84. Components of Kastelholm Castle. (Carlsson 1993 p. 8)

10.2.1. Archaeological dating

Already in the 1980s research at Kastelholm revealed a significant discrepancy between the archaeological and building-archaeological interpretations of the structures. The archaeologist Magnus Elwendahl has studied various categories of finds — such as coins and pottery — which suggest the conclusion that the oldest earth layers of the castle are in the north section (present-day northern outer bailey).[6]

During the 1990s the archaeologist Ronnie Carlsson has carried out analyses of various groups of material, and his latest results are based on analyses of archaeological material data and scientific dating methods.[7] The difference in methods among the various researchers is most clearly evident in

[1] Over the years the history of Kastelholm has been studied by e.g. Reinhold Hausen (Hausen 1934); Iikka Kronqvist (Kronqvist 1934); Carl Jacob Gardberg (Gardberg 1967, 1987 and 1993a); Mats Dreijer (Dreijer 1983).
On the history of the castle, see Carlsson 1991, pp. 559-570; Lovén 1996, p. 149 and Törnblom 1996, pp. 15-20, 25-37.

[2] E.g. Elfwendahl 1987.

[3] On building archaeology and excavations at Kastelholm, see Andersson S. et al 1992; Bäck et al. 1991; Carlsson et al. 1989; Carlsson 1993, pp. 30-95. On a clearly critical approach, see Törnblom 1996, pp. 19-22.

[4] E.g. Gardberg 1993a, pp. 93-96 and Palamarz E.& Palamarz P. 1993, pp. 160-167.

[5] Carlsson 1993, p. 8.

[6] E.g. Elwendahl 1989, pp. 365-394.

[7] Carlsson 1993.

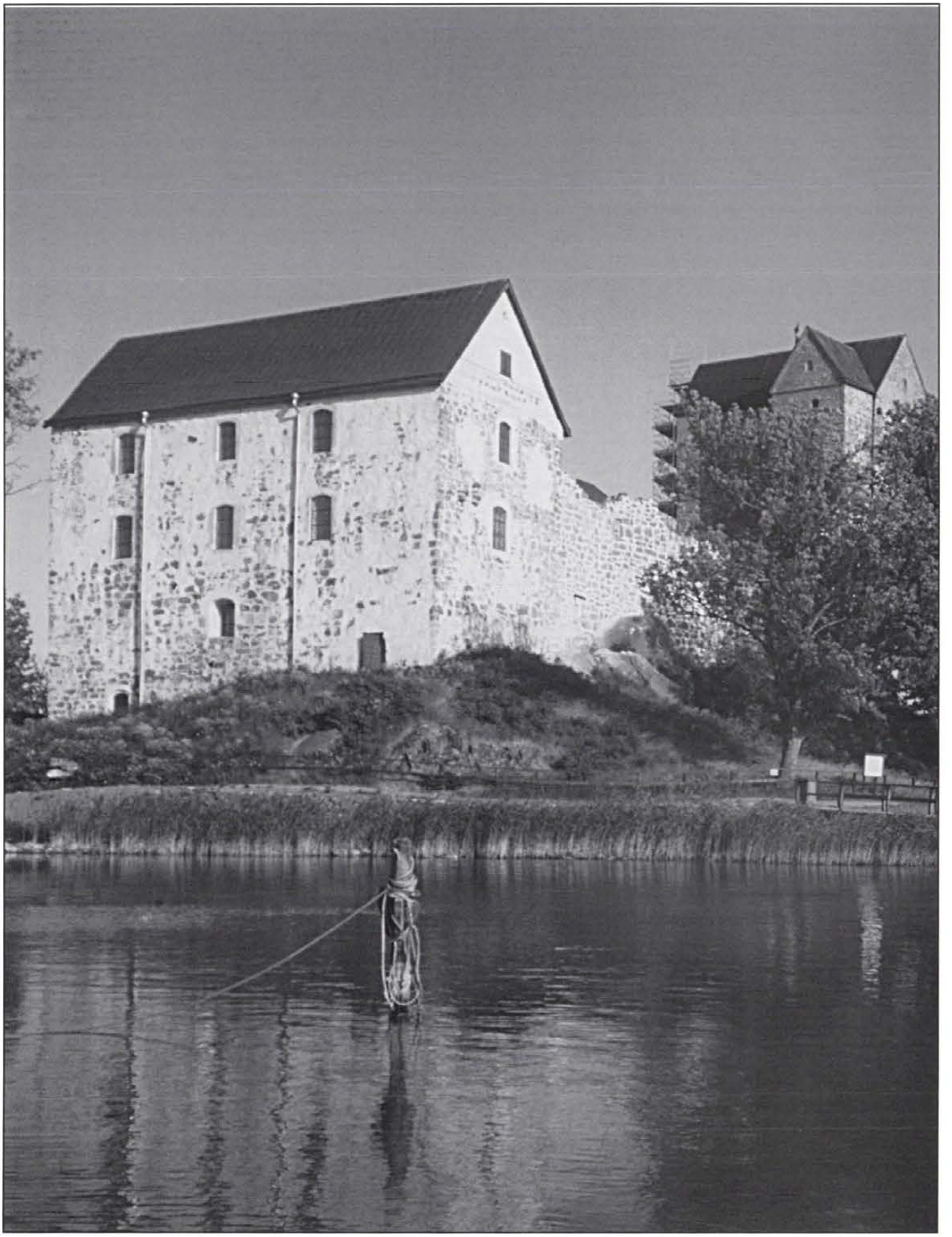

Fig 85. Kastelholm (Fi. Kastelholma).
The castle of Kastelholm is mentioned for the first time in sources in 1388. In 1434 it was the only castle in Finland to be involved in the Engelbrecht uprising, being taken by Erik Puke. The artillery pieces of Kastelholm were removed in 1504 and some of the walls were torn down. The castle was invaded and burnt down by Danish troops in 1507. Kastelhom was rebuilt in from 1514 to 1518 it was under the command of Hemming Gadd. The castle was renovated during the 1500s, but it suffered a fire in 1619. Kastelholm finally lost its role in 1634 and it burned again in 1745. Conservation works were launched in 1891. View from the northwest. (Photo P.O. Welin)

attitudes to radiocarbon dating. The archaeologists (Magnus Elwendahl and Ronnie Carlsson) have criticized the radiocarbon dating of mortar, while the building archaeologists (Elizabeth and Pjotr Palamarz) have largely accepted them.[1]

The archaeologists have also criticized the comparative art-historical method and have suggested that the building materials which have been given old dates (e.g. brick) originally came from other castles.[2] The suggestion of recycling or secondary use of building materials is by no means new. It can be suggested, however, that in most cases a building archaeologist working on site can distinguish for example secondary brick with reference to older mortar or fragmentation.

The results obtained by archaeologists are more accessible to evaluation, because they have drawn up all required research reports up to the year 1989 and their chronological framework is given, for example, in Carlsson's study. On the other hand, the chronological criteria followed by the building archaeologists are contained in various articles, in which the various factors are not analysed in as much detail as by the archaeologists. Therefore, it is much more difficult to discuss their criteria.

The first distinct problem is the comprehensiveness of the available archaeological material. For example, Elfwendahl's analysis of pottery clearly concentrates on the north section and the area outside the walls. Some of the archaeological material has been analysed before the whole castle area has been excavated.[3] It also appears that the excavations beyond the walls were conducted with due care and the stratigraphy and interpretations are clear and distinct. The excavations of the 1980s in the main castle area entailed obvious problems, even in establishing stratigraphical order.[4]

A further impediment of the archaeological material is the clearly altered views of the directors of the excavations and later researchers (mainly Ronnie Carlsson) concerning the layers and their history. For example in Carlsson's study, tables XIV and XV contain differences of interpretation between the excavation director (Elfwendahl) and Carlsson that are of such magnitude that no similar cases are presented in Finland — at least in print. The director of the excavation believed that he excavated a lime mortar layer of the 14th century, but this was dated to the early 18th century in the later interpretation of the feature. It was also believed during the excavation that a 16th-century earth layer was being investigated. This, however, turned out to be from the 20th century.[5]

A third special feature is the use of various categories of archaeological material to date the stages of excavation. A pervasive feature of the chronological criteria is that according to the researchers medieval coins were never lost at their time of minting or soon thereafter, but only after a long period of use. For example stage III of excavated section K 18 is dated to 1500-1550 and the associated coins are a *hvid* (15th century), a bracteate (1400-1450), a copper coin (early 15th century), and a copper coin (1441-1448). Carlsson clearly maintains that coins are always in long-term circulation.[6] This suggestion entails the problem that for example at Kastelholm coins were used throughout the 1400s and 1500s. However, people either managed to lose older coins, or coinage fifty years old was in use all the time at Kastelholm.[7]

Another feature is the radiocarbon dating of organic materials, which appear to be seriously mixed. For example, in section KS 18 there were obvious difficulties in interpreting part of the wood samples of the well as belonging to the well structures and part as belonging to the fill. In many places, Carlsson clearly takes exception to his excavation data in interpreting various samples. Altering the stratigraphy of samples according to interpretation is always problematic.[8]

Like other archaeologists, Carlsson underlines the reliability of radiocarbon dates obtained from organic material and the fact that they date building work in masonry well into the 15th century.[9]

A further problem of archaeology is medieval shore displacement in the castle area. Linear, or

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[1] Christian Lovén, who has also participated in research at Kastelholm, has completely omitted the radiocarbon ages of mortar from his dating results (Lovén 1996, pp. 149-152).

[2] E.g. Carlsson 1993, p. 119.

[3] For example in 1993 there were excavations in the south part of main castle and it is possible that after the excavations extended to the main castle during the course of the 1990s the archaeological material also changed.

[4] On the locations of the excavated sections and their applicability for research, see Carlsson 1993, pp. 13.

[5] Carlsson 1993, pp. 78-79.

[6] On Carlsson's chronological criteria, see e.g. Carlsson 1993, p. 19, 75-77.

[7] Carlsson 1993, pp. 75-77. Cf. Lovén 1996, p. 15; Törnblom 1996, p. 87.

[8] Carlsson 1993, pp. 75-77, 108-119.

[9] Carlsson 1993, pp. 69-71, 108-119.
The problematic interpretation and contradictions of Carlsson's results have been discussed e.g. by Lena Törnblom (Törnblom 1996, p. 35) and Christian Lovén (Lovén 1996, p. 151). The problem of tree age is always associated with radiocarbon dates obtained for timber. On this problem, see e.g. Kankainen 1989.

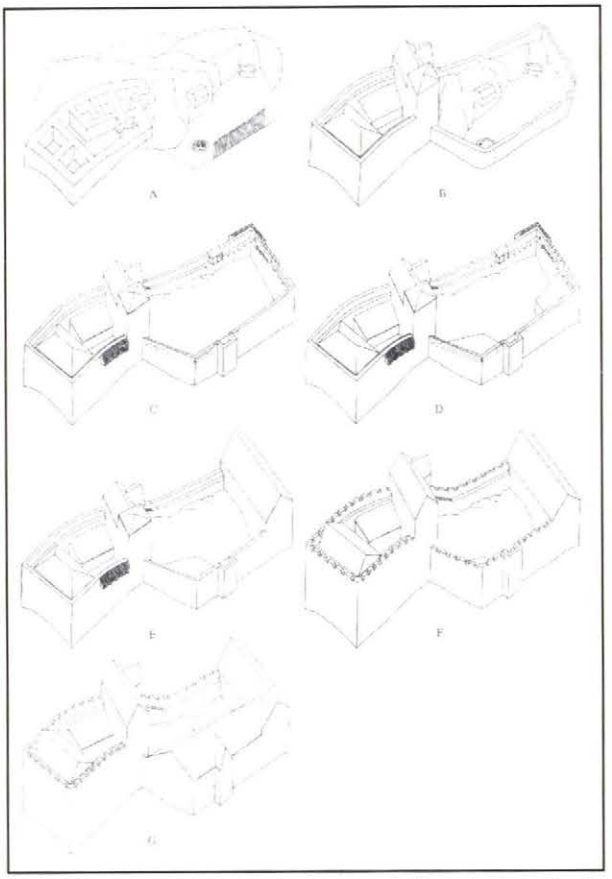

Fig. 86. History of construction of Kastelholm Castle according to E. & P. Palamarz.
A = late 14th c.; B = early 15th c.; C = mid-15th c. ; D = post 1482; E = Knut Posse's period (late 15th c.); Hemming Gadh's period (1510s); G = mid-16th c. (Palamarz E. & Palamarz P. 1992, figs. 1-6, 8)

direct, shore displacement has been used as a chronological criterion for dating old walls.[1] Studies of the 1970s maintained that average land uplift was approximately 0.55mm/yr.[2] In the 1980s Harry Alopaeus assumed that land uplift took place at a rate of ca. 0.6 mm/yr.[3]

In his own study, Carlsson summarizes the views of most archaeologists regarding the history of the castle as follows. The renewal or renovation of timber manor or fortification began in the mid-15th century following the Engelbrecht uprising in Sweden. The north section (outer bailey) was built during the second half of the 15th century, at which stage the outer bailey gate was already at the location of the later projection (gate tower). At the turn of the 15th and 16th centuries the castle was surrounded by a palisade and the southeast outer bailey was built, being linked to a vaulted structure in front of the gate tower. During the 16th century, a tower was built at the northeast corner of the outer bailey, a projection-gate tower at the east side and a building at the southeast and southwest corners. Auxiliary or household structures were built in the southeast outer bailey. Around the turn of the 16th and 17th centuries, the old castle was converted into a palatial residence, in which connection the southeast outer bailey was torn down and the north and east wings of the outer bailey proper were raised to three-storey height.[4]

10.2.2. Age according to building archaeology

Kastelholm Castle is traditionally divided into two parts: the south ward (main castle) and the north ward (outer bailey). The main castle measures ca. 17-20 x 30 metres and the outer bailey is 22-30 x 45 metres. Excavations in the 1980s have revealed an outer bailey on the east side which is assumed to have been torn down already in the 16th century. Basing on their many years of building archaeology at Kastelholm, the Palamarzes presented in the early 1990s their own suggestion of the history of the castle (Fig. 86). According to them, the main castle of stone was built in the late 14th century, at which stage the outer bailey consisted of a palisade and a few small structures. In the early 15th century, the main castle was raised in height and the lower outer bailey wall with diagonal southeast and northeast corners was built of stone. In the mid-15th century the outer baileys were aligned in straight configuration and raised in height, and a gate tower (projection-type) was built in the east side. After 1482, two lower auxiliary structures of masonry were built within the walls of the outer bailey. The northern one was replaced with a three-storey building already in the late 15th century. In the early 16th century, the outer bailey walls were raised with the addition of crenellation and around the middle of the century an east section and a new gate tower were added. In addition to the actual outer bailey, the southeast outer bailey or fortification was added in the early 16th century. Linked with this feature was a vaulted space in front of the gate tower. The more detailed structure of the southeast fortification and its association for example with the main castle are still open. The Palamarzes' results fall into a long tradition of research. For example, Reinhold

[1] Since the 1980s, fluctuation in shore displacement has been presented as an alternative to linear shore displacement. E.g. Ödman 1983, pp. 26-41; Ödman 1987, pp. 45-75.
[2] E.g. Carlsson 1993, p. 62.
[3] Alopaeus 1984, p. 87.
[4] Carlsson 1993, pp. 212-216.

Hausen and Iikka Kronqvist originally presented similar results.[1]

Cecilia Åqvist, who has excavated at Kastelholm for many years, discusses the history of the castle in an article from 1992 with reference to the radiocarbon dating of lime mortar and organic material. She does not, however, present any detailed account of the history of the castle, but notes in a general vein that a timber fortification was built between 1374 and 1386. Masonry construction came under way after 1388 and the stone wall of the outer bailey was built immediately after 1399.[2]

The most recent stage in research is Christian Lovén's doctoral dissertation from 1996, in which he avoids taking an unequivocal position on the oldest stages of the castle. According to him, the second stage included the north outer bailey as a whole, which is dated to the mid-15th century. The outer wall to the south of the main castle (Carlsson's outer bailey) is dated by him to around 1500.[3]

10.3. Summary

The history of Kastelholm Castle has been studied with exceptional means and funds for several years, and a great deal of new information has been obtained. However, the distinct and marked differences of opinion among researchers prevent the formation of an overall picture.[4]

I regard Carlsson's compiled archaeological interpretation as suffering from a few inconsistencies that make it necessary to question the results. On the other hand the results of building archaeologists (mainly the Palamarzes) are clearly tentative, and may be clarified at a later stage.[5] Nevertheless it is easier to assume that the construction of the outer bailey (north section) came under way in the early 15th century at the latest, the walls were raised in height together with the main castle in the mid-15th century and the first masonry structures were built within the walls at the close of the century. The oblique southeast corner of the outer bailey was straightened with the addition of a new section in the 16th century, while the northeast corner was already straightened in the mid-15th century.

The most significant issue with regard to the outer bailey structures was the southeast outer bailey, "discovered" by archaeologists and building archaeologists in the 1980s, and the adjoining vaulted space directly in front of the north wing/outer bailey. With regard to the southeast outer bailey, the Palamarzes suggested that it was built in the early 16th century to serve as the outermost fortification of the castle. Carlsson, in turn, claims that the walls and the vaulted space already belonged to the oldest stage of the castle, i.e. the late 15th century as suggested by him. In 1991 Carlsson discussed this problem in a published research report, in which he refers to a C14 date of mortar, according to which the vaulted space dates from the early 15th century.[6]

In 1991 Carlsson drew an outline sketch of the topography of the castle and its environs based on the two-metres a.s.l. contour (which corresponds to the 16th-century situation reconstructed with the 0.55-0.6 mm/yr linear curve). In this reconstruction, the area of the southeast outer bailey is in an empty area southeast of the castle. Unfortified, this area was definitely a problem for the whole defence of the castle. The emergence of this area from the sea may have followed a completely different course, if we apply also here the suggestion that sea level fluctuated markedly in the Baltic during the Middle Ages. It can be assumed that the rapid decline of sea level in the 14th and 15th centuries created the need for the southeast outer bailey of Kastelholm already in the 14th century or by the beginning of the 15th century at the latest. Concerning the relationship of the vaulted room and the gate tower (projection) of the north section Carlsson observes that the vaulted space was built before the projection.

The rise of sea level in the Baltic at the turn of the 15th and 16th centuries may also explain the events of 1504, when part of the castle wall (*mantelmur*) was torn down.[7] This may have been the southeast outer bailey, whose low-lying walls were affected by the water and had to be torn down as they could not be repaired, having been originally at too low an elevation.

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[1] E.g. Palamarz E. & Palamarz P. 1993, pp. 160-167. Christian Lovén has dealt with the history of construction at Kastelholm in 1996, but is less definite in his conclusions than the Palamarzes (Lovén 1996, pp. 151-152). An extreme position on many issues is presented by Lena Törnblom (e.g. Törnblom 1996, pp. 19-20, p. 35, p. 71). Törnblom's studies, however, concerned the political history of the castle and they do not contain any overview of its architectural history.

[2] Åqvist 1992.

[3] Lovén 1996, pp. 151-152.

[4] E.g. Lovén 1996, pp. 157-158 and Törnblom 1996, pp. 19-22, 35. The most recent presentation by a Finnish scholar is by Carl Jacob Gardberg, who largely agrees with the Palamarzes' suggestions regarding the history of the castle. Gardberg 1993a, pp. 92-103, 143.

[5] On the Palamarzes' results, see Lovén 1996, pp. 149-151 and Törnblom 1996, p. 19.

[6] Carlsson 1991, p. 165.

[7] Hausen 1934, p. 22; Carlsson 1993, p. 21; Törnblom 1996, pp. 90-91.

Fig. 87. Olavinlinna (Sw. Olofsborg).
The construction of Olavinlinna castle was begun in 1475 by Erik Axelsson (Tott), and by 1483 the castle was at least partly complete. It withstood the attacks of Russian troops in 1496-96 and passed without conflict into the control of Gustavus Vasa in 1523. The castle underwent repairs in the 16th and 17th centuries, but was taken over by the Russians in 1743. Olavinlinna underwent refurbishment throughout the 18th century and Swedish attempts to recapture it failed. The military use of the castle ended in 1847 and the first restoration works were undertaken in 1872-78. View from the northwest. (Photo P.O. Welin)

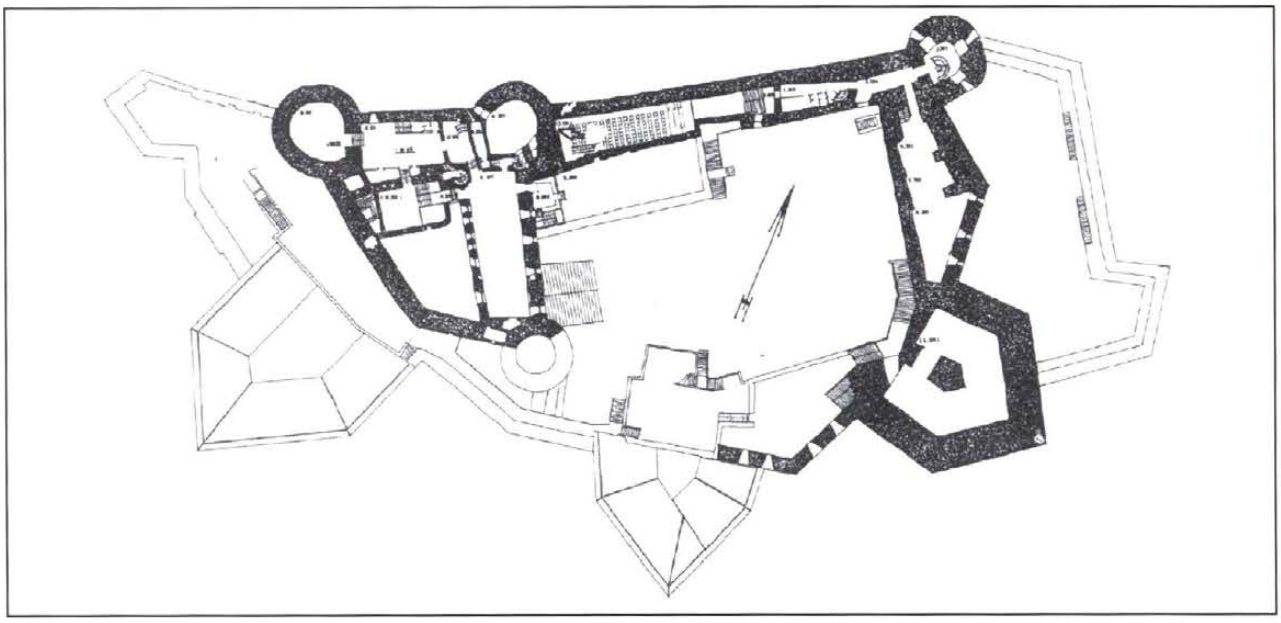

Fig. 88. Plan of Olavinlinna Castle (Härö 1997 p. 32).

11. OLAVINLINNA CASTLE

11.1. History of research

Studies concerning the history of Olavinlinna Castle in Savonlinna, Eastern Finland, began in the 19th century with the work of J. R. Aspelin. (Fig. 88) The castle has come under repairs on several occasions in the 20th century and major repairs and research work were begun in 1961 and continued until the re-inauguration of the castle in 1975.[1] For many years Antero Sinisalo of the National Board of Antiquities was responsible for research and investigations in Olavinlinna Castle and published a number of articles and studies on the castle. Owing to Antero's Sinisalo's untimely death, a history of the const-ruction of castle in the Middle Ages remained un-written.[2] During the 1980s and 1990s the National Board of Antiquities had a local office at the castle and for example dendrochronological determinations of various structures have been carried out, but so far no material has been published.[3]

11.2. The outer bailey of Olavinlinna Castle

Olavinlinna is an exceptional castle in Finnish condition in that it was apparently built according to a uniform plan within a very short period in the second half of the 15th century. Work began with the construction of a wooden fortification in 1475, by 1477 masonry components were already under construction, and the main castle was apparently completed in 1483, which means that a whole castle of masonry was built in five years. The original plan included an outer bailey of rectangular layout with high, slender towers at the corners. The precise shape of the outer bailey is not known, although Sinisalo's studies point to the existence of the oldest walls in many places beneath the present outer bailey (Fig. 87).[4]

With reference to the present state of research on Olavinlinna Castle, it can be noted that the outer bailey was apparently built at the end of the 15th century along with the rest of the castle. At the outer corners of the outer bailey were two high and narrow towers, of which at least one was in the shape of a 3/4 circle.[5]

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[1] Gardberg 1993a, pp. 120-121.

[2] On Sinisalo's studies on Olavinlinna Castle, see Sinisalo 1966, Sinisalo 1972, Sinisalo 1978 and Sinisalo 1987. The history of the castle is known from an extensive study by Helge Pohjolan-Pirhonen (Pohjolan-Pirhonen 1973).
On heraldic plaques in Olavinlinna castle, see Härö 1997, .

[3] A total of 53 dendrochronological samples have been taken from structures in Olavinlinna Castle. These show that major parts of the main castle were built around 1480. There was also extensive building activity during the 16th century. Zetterberg 1990; Härö 1997, pp. 31-38.

[4] E.g. Sinisalo 1972, pp. 41-45 and Gardberg 1993a, pp. 109-121; Lovén 1996, pp. 189-190.

[5] Sinisalo 1972, pp. 43-44.

12. THE CONSTRUCTION OF OUTER BAILEYS IN MEDIEVAL FINLAND

12.1. Chronology of Outer Bailey Construction

Discussed in detail in the preceding sections are the various dates and chronology of the construction of outer baileys in Finnish castles. The following section summarizes the data and reviews all the medieval castles of Finland as a uniform body of material. The varied material, however, poses a number of problems, because some of the dates proposed for the castles are with reference to different methods (e.g. Turku Castle), while others are based on building archaeology at a very general level.

12.1.1. The construction of outer baileys (ca. 1380-1440s)

Turku Castle

In Finland, the early stages of constructing outer baileys can be dated to the second half of the 14th century. With regard to Turku Castle, it can be assumed that at least the main part of the eastern outer bailey was built during the early 15th century. Only indirect chronological results are available for the outer baileys on the south side, but we can deduce that at least the upper south ward also dates from the turn of the 14th and 15th centuries.

The results are largely in agreement with views already presented in the 1940s by Iikka Kronqvist on the history of the outer bailey. Kronqvist's chronology was mainly based on the 14th-century dating of the German castles which were the models and examples for Turku Castle.

Kuusisto Castle

The oldest outer bailey components of the episcopal castle of Kuusisto are towers C and D and their brick curtain walls in the areas of outer baileys II and III. The oldest outer baileys were steeply contoured locations and at least in the early stages they lacked stone buildings. An exceptional structural feature was the use of large brickwork relieving arches to which there are no parallels in the Finnish material.

It is difficult to date the oldest outer bailey structures at Kuusisto, because the archaeological excavations place the oldest towers and walls in the 14th century, but dendrochronological results from 1996 suggest that at least most of the structures are from as late as the close of the 1430s — the term of Bishop Magnus II Tavast. Also outer bailey I on the south side can be broadly dated to the early 15th century. Accordingly, the presently known area of outer baileys had been built almost completely by the mid-15th century.

Hämeenlinna Castle

With reference to the need to protect the gateways of the main castle, the oldest walls of the outer bailey of Hämeenlinna Castle are dated to as early as the 14th century, but the curtain wall of the typical defensive outer bailey surrounding the whole main castle is given a date well into the 15th century.

The idea of a typical defensive bailey (Zwinger) under construction for at least a century is extremely rare in other parts of the Baltic. The dating of the oldest part of the outer bailey is based solely on the architectural history of the main castle and neither archaeological nor natural scientific dates are available.

The most recent conception is a revised history of construction presented by Knut Drake in 1996, whereby the construction of main castle did not begin until the second half of the 14th century and the outer bailey would have been the original castle of the early 14th century.

I would claim that the Zwinger-type outer bailey of Hämeenlinna Castle was quickly built as a low fortification surrounding the whole outer bailey. With reference to parallels among the Teutonic Order and the nearby topography of the castle area, it can be dated to the turn of the 14th and 15th centuries.

Viipuri Castle

The history of construction of Viipuri Castle is anything but clear in its details, and accordingly the dating of the outer bailey is largely open. It has been suggested, however, in the research literature that the oldest outer bailey of Viipuri Castle, the so-called smithy ward, dates from the 14th century. It is nevertheless possible that this was part of the older round castle structure that was converted into the outer bailey during the 14th century.

Parts of the present outer bailey may date from the term of Karl Knutsson (1442-1448), although there is no definite archaeological basis for this date.

Raasepori Castle

The east outer bailey has been regarded as the oldest outer bailey of Raasepori Castle. According to Carl Jacob Gardberg, this structure can be linked with a source from 1427 mentioning *lagman* assizes held in the outer bailey of the castle. According to Knut Drake, the east outer bailey is dated more broadly to the 15th century.

Even the present, insufficient, building-archaeological research suggests that apparently the eastern outer bailey and the barbican tower guarding the gate of the main castle are among the oldest components of the outer baileys, being older than the year 1427. I feel it is possible that all the outer baileys were already built in the early 15th century. This may be indicated by the dating of the palisade encircling the whole castle island to as early as the late 1420s.

Kastelholm

There are considerable discrepancies of interpretation regarding the stages of construction and age of Kastelholm Castle, but building archaeology suggests that the northern outer bailey (Norra Längan) of the present castle was already built in the early 15th century. This date is largely based on the results of building archaeology and the radiocarbon dating of mortar, but some of the archaeologists studying the castle have also dated the castle to the early 15th century with reference to artefacts. Most of the archaeologists have interpreted the artefacts as indicating that the construction of the main castle of stone did not begin until the mid-15th century and that the northern section (oldest outer bailey) was not built until the end of the 15th century.

12.1.2. Renewal and restoration of the outer baileys (ca. 1450-1520s)

Turku Castle

The south parts of the oldest wall sections of the east outer bailey of Turku Castle have markedly sunk and leaned towards the south. There has been no corresponding leaning in the east and north parts, but the structures such as the towers and walls have sunk some three metres beneath the original building elevation. The collapse and sinking of the walls in this manner led to extensive renovation works, which are mentioned in sources from 1505 and 1507. In agreement with earlier researchers, such as Carl Jacob Gardberg, I feel we can link the references of 1505 and 1507 with the extensive repairs to the outer bailey. At that stage, the walls of the outer bailey were straightened and for example the shape of the towers was changed to bevelled form instead of the earlier four-sided shape.

At Turku Castle, clear indications of the raising of the walls are not from before the 1560s, when the 6-7-metre-high brick part was built, but it is possible that the walls were already repaired during the Middle Ages. With regard to the outer baileys on the south side we can definitely say that both were built before the repairs of the early 16th century. The walls of the upper southern outer bailey — the smithy ward — contain indications suggesting that they were widened, but it is impossible to date these works in the light of present data.

Kuusisto Castle

At Kuusisto Castle, the brick-arched walls of outer baileys II and II were walled up with stone during the Middle Ages. These features suggest that the walls of both outer baileys were reinforced during the Middle Ages, and I would claim that this work was linked to the raising of the height of the walls. This construction stage also appears to have involved the distinct levelling and paving of the ward of the outer baileys, in which connection we can assume that the baileys finally changed from defensive structures to become the outer bailey proper, an important part of everyday life in the castle. It is difficult to date these developments in terms of building archaeology, but the archaeological material as such suggests that the levelled ward and the paving may date from the second half of the 15th century, perhaps from the years following the fire of the 1480s.

There is no definite data on the raising of the walls in the area of outer bailey I, but the later history of the walls and towers is clearly evident. The marked leaning and sinking of the walls and towers in the areas of outer baileys I and II had the result that some of the walls were fitted with external supports and some were rebuilt in outer bailey I. The new components of outer bailey I (towers A and B and the middle section of the wall) came to have several low embrasures reflecting a change in medieval defence concepts

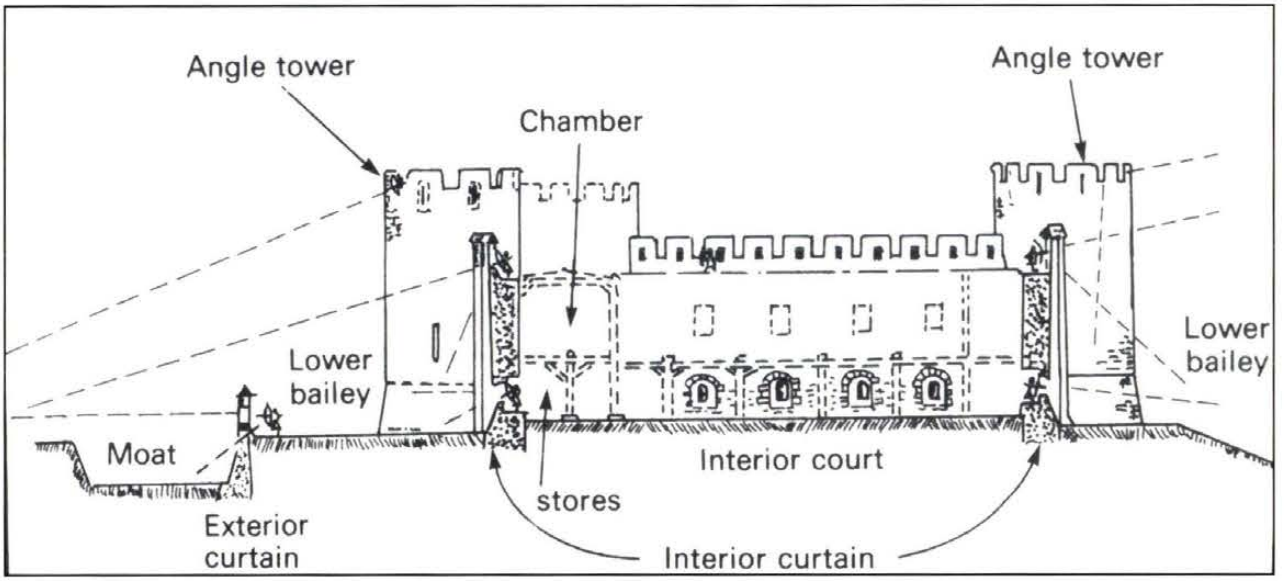

Fig. 89. Schematic presentation of the close-range defence of a medieval castle.
The lower bailey could be monitored and fired upon from the main castle. The exterior curtain was so low that it was also possible to fire over it from the main castle into the area in front (Fig. Contamine 1993, p. 113, Figure 2. See also McNeill 1994, pp. 101-102).

from the top of the walls to ground level in the 16th century.

Hämeenlinna Castle

At Hämeenlinna Castle, the most active stage of outer bailey construction dates from the 15th century, when, according to experts, the walls encircling the main castle and the towers at the corners of the outer bailey and in the middle of the wall sections were built.

Around the turn of the 15th and 16th century, an additional tower was built and the walls were reinforced. The dating of the construction of the outer baileys at Hämeenlinna to the 15th century in particular is completely based on the architectural history of the main castle. The structures of the walls and towers do not display any indications that the outer bailey was raised in stages. Experts maintain that already in the first stage, outer bailey walls and towers were built to the height known from later sources. I would suggest that the towers and walls were raised at the same time in several stages.

Viipuri Castle

During the 15th century, a large outer bailey was built on the west side of the main castle. There is no definite idea of the form of the outer bailey or the number of towers, and suggested dates vary between the 1440s and 1470s. The dating is based on loosely interpreted historical sources and research material that has undergone highly superficial investigation.

Raasepori Castle

According to Knut Drake, the southeast and south outer baileys at Raasepori were built during the second half of the 15th century. Towards the close of the century at least towers were added to the corners of the outer baileys, in addition to the construction of the walls.

Kastelholm

During the 15th and 16th centuries the north outer bailey of Kastelholm was renovated and raised in height. A defensive bailey was possibly built at this time on the east side of the castle. Archaeologists date this structure to the close of the 15th century, while building archaeologists date it to the beginning of the following century.

Olavinlinna Castle

At Olavinlinna the construction of the whole castle and the outer bailey can be dated to the close of the 15th century. At that stage, the large outer bailey and the 3/4 round towers at its corners were built.

12.2. The Components of the Outer Baileys

The construction of outer baileys and wards in castles in Finland was no uniform tradition following the same heritage. Almost every castle was built in its own manner and from its own starting points (Fig. 84).

12.2.1. Outer baileys proper (Vorburg)

In the introduction, the outer baileys are divided into two groups. The first of these consists of the outer baileys as such (Vorburg). These structures are located on one side of the main castle and they often include buildings of masonry. Their area is considerably large in relation to the main castle - often bigger than the latter. In this Finnish material, this type of outer bailey is represented by the eastern outer bailey of Turku Castle, which is limited to the east front of the main castle and is larger than the actual main castle. The earliest definite indications of the masonry structures of the outer bailey are from the 16th century (Fig. 90).

Also meeting the criteria of an outer bailey proper is the outer bailey of Viipuri Castle, which consisted of several parts and had stone structures in its ward.

The third outer bailey of the above type is the north outer bailey of Kastelholm Castle, which is larger than the actual main castle and included auxiliary and household-related structures of stone that were built in the 16th century at the latest[1] The outer bailey of Olavinlinna Castle was originally very large and included auxiliary buildings.

The oldest outer baileys of large area are dated to the turn of 14th and 15th centuries (Turku and Kastelholm); Viipuri may be from the middle of the 15th century and Olavinlinna from the close of the century. It is interesting to note that except for Olavinlinna no new outer baileys were built in the late 15th century or during the following century. Work now concentrated on repairing and renewing the older structures.

12.2.2. Zwingers (defensive outer baileys)

The other form of outer bailey structures consists of so-called Zwingers. Typical of these structures is a configuration in which they encircle the main castle at relatively close distance (10-25 metres) and cover large parts of the area in front of the castle (Fig. 89). In many cases these structures lacked auxiliary buildings, at least in the early stages, and their ward areas sloped steeply down to the outer walls.

The best example of this type of bailey structure is the upper south outer bailey (smithy ward) of Turku Castle, which appears to meet all the criteria of a zwinger (an outer defensive bailey). The lower south outer bailey (the herb ward) was a large outer bailey structure, but it is difficult to classify it.

At Kuusisto Castle, at least outer bailey II and III were initially zwingers. It is difficult to precisely define the nature of outer bailey I. Its yard area appears to have been originally sloping and no auxiliary buildings are known from it.

The outer bailey of Hämeenlinna Castle was a typical zwinger. Viipuri Castle may have had a same type between the main castle and the bridge leading into town, but there is not enough data to determine this. It has been traditionally maintained that all three outer baileys at Raasepori Castle were zwingers, but the south outer bailey can be reconsidered, as the remains of household-related structures have been found at Raasepori. On the other hand, the yard area was steeply contoured. Kastelholm Castle probably had some kind of zwinger on the east side of the present castle. The walls and towers of this structure have been excavated only in places.

At many sites, the yard or court of the zwinger was filled and levelled in later years to serve household functions.

At Turku Castle, the zwinger can be dated to the turn of the 14th and 15th centuries; at Kuusisto outer baileys II and III date from the 1430s at the latest and outer bailey I more broadly from the middle of the 15th century. The zwinger of Hämeenlinna Castle is from the 14th-15th centuries; at Viipuri Castle this structure may be from the 14th century.

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[1] There are different interpretations of the structures in the north outer bailey of Kastelholm Castle; the Palamarzes date the stone buildings to the 15th century (Palamarz E. & Palamarz P. 1993, pp. 160-169), while for example Lena Törnblom suggests that the oldest stone buildings were not built until the early 16th century (Törnblom 1996, p. 119). See also Lovén 1996, pp. 157-158.

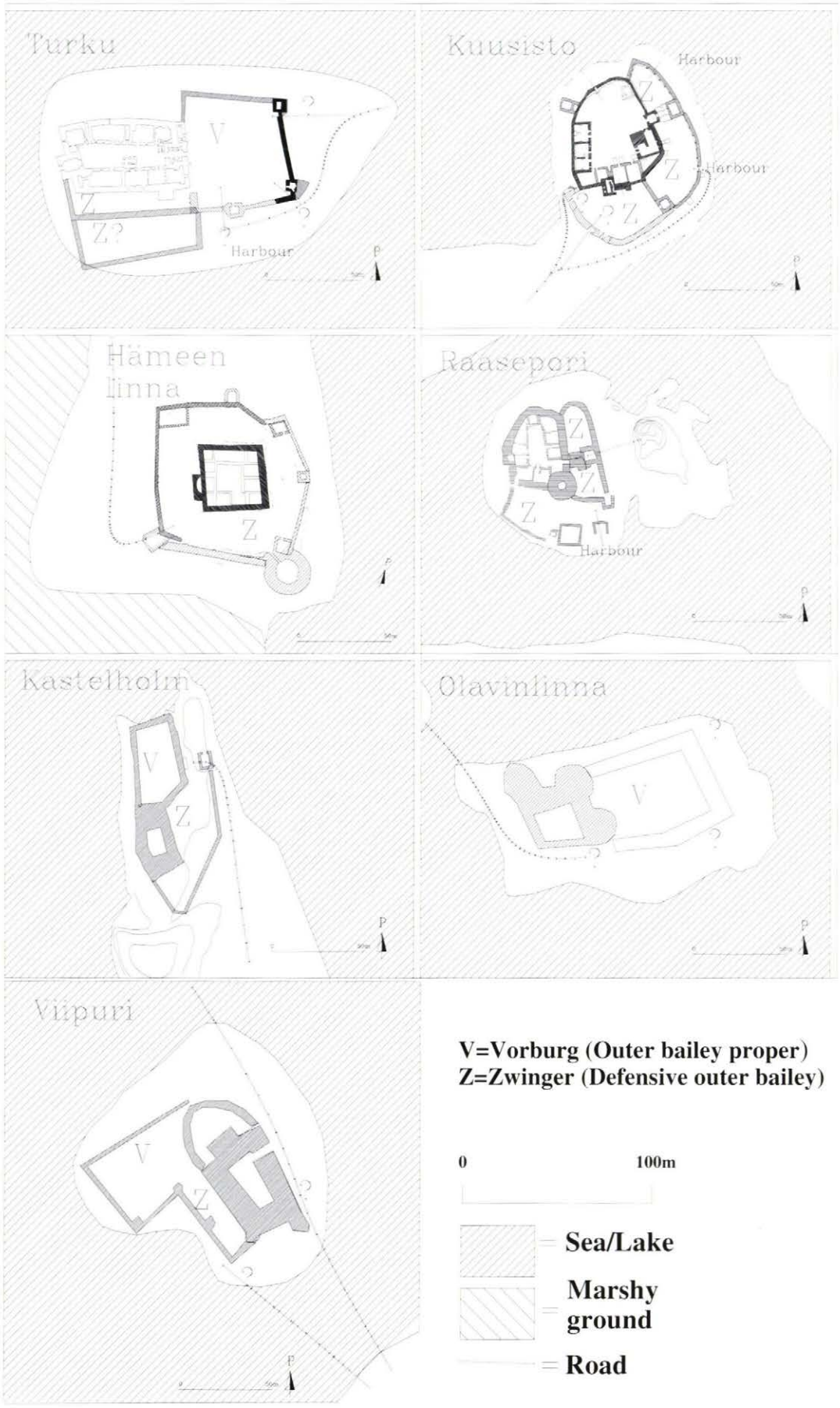

Fig. 90. The components and routes of access in the outer baileys (Drawing K. Uotila).

At Raasepori Castle it dates from the early 15th century, and that of Kastelholm Castle from the turn of the 15th and 16th centuries.[1]

All in all, 15 outer baileys can be distinguished in the medieval castles of Finland. Of these, four are large outer bailey structures and eight were initially zwingers, and three can be almost classed as zwingers. There do not appear to have been any chronological differences between the various types of outer baileys; different structures were used according to the situation and site. Both types of outer bailey were already built at the turn of the 14th and 15th centuries, and they remained in use until the turn of the 15th and 16th centuries.

The available material shows that outer bailey architecture and construction was clearly more varied in Finland than elsewhere in the Swedish realm or even in the area of the Kalmar Union. In Sweden, outer baileys were built at the largest castle. According to Lovén, multi-component castles in Sweden were well-equipped strongholds that remained in use for long periods. Large outer baileys, as at Turku, were in the castles of Stockholm and Kalmar, where the outer baileys were closely associated with the nearby towns and their emergence. The Swedish castles do not have clearly zwinger-type outer baileys.[2]

In comparing the castles of Sweden and Finland, it can be suggested in the latter, eastern, part of the realm outer baileys were needed at castles that were in use for long periods, such as Turku, Hämeenlinna and Viipuri. The differences in outer bailey architecture emerge in the smaller castles, such as Raasepori and Kastelholm. In Sweden, corresponding small castles of timber and masonry were destroyed in the Engelbrecht uprising, and were never rebuilt. On the other hand, the Finnish castles were reinforced and improved throughout the 14th and 15th centuries, and their decline did not begin until the 16th century. Outer baileys were very rare in the episcopal castles. The only definite case is Läckö, and possibly Uppsala. In this respect, the exceptional affluence and political authority of the Bishop of Turku may explain the construction of a large edifice such as Kuusisto Castle.[3]

In the areas of the Teutonic Order in the Baltic lands and south of the Baltic Sea outer baileys are quite common in the larger castles. A layout, as at Turku Castle or Kastelholm, where the main castle is accompanied by a large outer bailey and a defensive bailey surrounding the main part, is known for example from Tallinn, Tartu and Narva.[4] The model for the castle of the Teutonic Order was the castle of Marienburg (Malborg) in present-day Poland. At Marienburg — the main castle of the Teutonic Order — a complex system of outer baileys was developed, spreading from there into the Baltic lands. According to earlier studies, Marienburg had a large outer bailey (Vorburg) and a defensive bailey (Zwinger) encircling the main castle already in the late 13th century. A similar plan with two outer baileys was typical of the other castles of the Order.[5]

In Finland, only Hämeenlinna Castle has an outer bailey surrounding the whole main part; elsewhere defensive arrangements included steep faces of bedrock, as for example on the north side of the main part of Turku Castle, on the west and north sides of Kuusisto Castle, on the north and west sides of Raasepori Castle, and on the west side of Kastelholm Castle.

The forms of outer bailey architecture were clearly adopted from the territory of the Teutonic Order. In Finland, models and examples from the south were applied to specific castles and combined with the defensive opportunities of natural conditions.

12.2.3. The order of construction of the outer baileys

The various stages of the construction of outer baileys in Finnish castles reveal two courses of action. One was to build both the towers and walls of the outer bailey in a single stage. An example of this type is the east outer bailey of Turku Castle, where the oldest walls and the protruding towers were built at the same stage. There was a hiatus of roughly 20 years in the construction of the northeast tower and the north wall, but we may nevertheless assume that the original plan included the construction of the whole outer bailey.

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[1] Estonian researchers have actively debated the dating of the defensive baileys (Zwingers). In a work on all the castles of Estonia, Kalvi Aluve dates the introduction of the Zwinger baileys to the 1420s . (Aluve 1993, pp. 6-7, 95). This, however, has not been accepted in Estonia, and for example Kaur Alttoa and Boris Dubovik claim that the Zwinger bailey of Narva Castle was already built before 1343 and that of Viljandi Castle in the mid-14th century (Alttoa & Dubovik 1995, p. 94; Alttoa et al 1996, pp. 14-18.).

[2] Lovén 1996, pp. 57-180, 236-266, 276-347.

[3] E.g. Lovén 1996, pp. 206-207, 234-266.

[4] Alttoa 1993, pp. 11-16; Alttoa et al 1996, pp. 14-18; Aluve 1993, pp. 6-7, 95; Dubovik 1993, pp. 38-44; Tuulse 1942, pp. 73-94, 166-181.

[5] E.g. Biller 1998, pp. 204-205; Guerquin 1984, pp. 209-213; Krahe 1994, pp. 692-715; Krassowski 1990, pp. 285-290. Tuulse 1952, pp. 178-179. Cf. Pospieszny 1993, pp. 169-176; Pospieszny 1996, pp. 171-180.

At Viipuri Castle, it is possible that the walls and towers were from to the same stage of construction, but the results are based on a limited body of material. It has been suggested that at Raasepori construction proceeded so that the walls of one outer bailey and the tower associated with them were built at the time, as was also done at Olavinlinna. The structures of the east outer bailey of Kastelholm Castle may have included some kind of tower from the very beginning.

It is possible that the same architectural tradition is represented by the castles where construction began with the towers, which were then soon followed by the walls. At Kuusisto Castle towers C and D were built before the walls of outer baileys II and III, although the need for further construction was already taken into account in the initial stage. The towers include structural features (binding stones) suggesting that they were not designed as individual structures; the construction process had clearly begun with the building of the towers, and the walls were not built until the following stage - albeit with a possibly brief time-lag.

There may have been a single protective tower in front of the gate tower (projection) of the outer bailey of Kastelholm before the southwest outer bailey was built.

One of the core ideas of construction was that in the first stage only the outer bailey walls were built. The possible towers were not erected until later. At Turku Castle, both of the south outer baileys were initially built without towers, and it is possible they lacked them throughout the Middle Ages. At Kuusisto Castle, the oldest section of wall in outer bailey I was first built without towers, which were not added until the second stage of the outer bailey. An example of this method of construction is Hämeenlinna Castle, where at least most of the protruding towers are younger than the wall. Only the wall section and the Dansker tower in the north part may be from the same stage. Also at Kastelholm, building archaeologists claim that the first stage of construction contained only the wall of the north outer bailey, to which the towers and auxiliary structures were added later.

12.2.4. The towers

The locations of the walls of the outer baileys and the towers point to three types of layout. The first was to place the towers completely outside the line of the wall, or to within a few metres of it. There were three flanking towers of this kind[1] in the east outer bailey of Turku Castle; two, secondary, ones in the area of outer bailey I at Kuusisto as well as tower 12 to the northwest of the castle; and three towers at Hämeenlinna Castle. There is no definite information on the towers of Viipuri Castle, and at Raasepori the tower of the southeast bailey stood a few metres outside the line of the wall.

In the second group, the towers were built in the same line as the wall. In Turku Castle, the corner towers of the east outer bailey (the southeast and northeast towers) were located in the same line as the long walls and the flanking part was placed against the east wall. At Kuusisto, tower D appears to have been originally designed to join at least part of the walls in a straight line. At Raasepori the wall of the oldest, east, outer bailey and the tower are in the same alignment.

In the third group, the towers were built within the walls, for example the northeast tower of Hämeenlinna Castle and the tower at the northeast corner of the north outer bailey at Kastelholm and tower C at Kuusisto.

The locations of the towers have a chronological connection in that the flanking towers date from the 14th century to early 16th; the towers aligned with the wall are from the turn of the 14th and 15th centuries; and those within the walls are from the 15th and 16th centuries.

The number of towers in the outer baileys varies considerably. The east outer bailey of Turku Castle had three towers from the very beginning, but the north outer bailey of Kastelholm Castle, of highly similar configuration, originally had no towers. On the other hand, the south outer baileys of Turku Castle probably had no towers at all. Kuusisto Castle originally had two towers, and two more were built at a later stage. Hämeenlinna Castle had four towers, all of which were younger than the walls. Viipuri Castle possibly had five towers. There were three at Raasepori, possibly one in the east outer bailey of Kastelholm and one secondary tower in its north outer bailey and possibly two original towers in Olavinlinna. The outer baileys of the various castles had a total of 22 towers, and at the close of the Middle Ages only the two south outer baileys of Turku Castle lacked towers[2].

[1] The term refers to a tower beyond the line of the wall, from which the adjacent lee of the wall could be fired upon. See Lovén 1996, pp. 33; Tuulse 1957, pp. 122-124.

[2] This may only be apparent and the result of insufficient data.

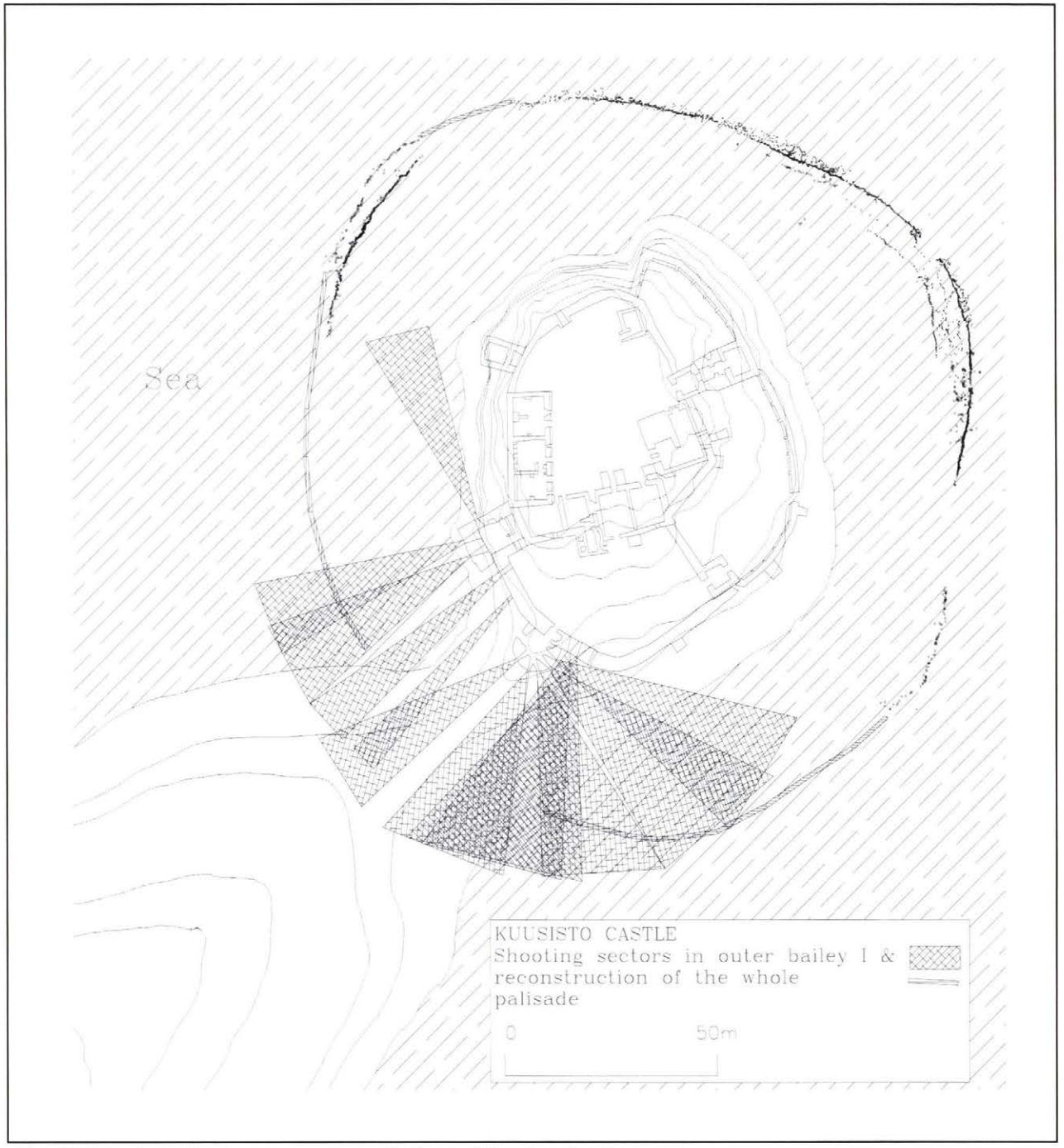

Fig. 91. The defensive structures of outer bailey I of Kuusisto Castle.
Over ten embrasures for cannon were built in the walls of outer bailey I and towers A and B (ca. 1480-1520). Fire from these locations covered the land route connecting with the main island of Kuusisto. Moreover, fire from most of the cannon extended to the shore areas (particularly towards the south). In this illustration the efficient sector of the cannon is given as ca. 50 metres. The illustration includes a reconstruction of the palisade. (Drawing by K. Uotila).

In terms of forms, rectangular and square towers were the only configuration built in the 14th and 15th centuries. The pentagonal and hexagonal towers of Turku Castle are probably from the turn of the 15th and 16th century.[1]

The barbican towers

Some of the outer bailey towers were clearly built to serve as barbicans guarding the main entrance to the castle.[2] During the 14th and 15th centuries, access to the main castle at Kuusisto was via the east tower (G) of the main castle. Tower D, in the middle of

[1] On the history of polygonal medieval buildings, see Hiekkanen 1990, pp. 246-254.

[2] E.g. Tuulse 1957, pp. 265-266.

outer baileys II and III was built to guard tower G. At a later stage there was another entrance to the castle on the south side, which was guarded by tower B in the middle of outer bailey I.[1]

At Raasepori, the tower of the east outer bailey has been regarded as a typical barbican guarding the main entrance. A third, highly similar layout may have been applied in the gateway (projection) of the northern outer bailey of Kastelholm Castle and the possible tower that guarded it. In this case, the outer tower may have been associated with the east outer bailey[2]. These examples show that barbican towers were built from the beginning of the 15th century to the early 16th century.

Gate towers

There is limited data on the gateways and gate towers, although these structures were common in medieval castles. The gate towers were often the part of the castle that suffered most in battles and they have always been among the most important components of castle, which means that repairs and renovation were undertaken more readily than in other parts of the outer bailey.[3]

The medieval gate tower of the east outer bailey of Turku Castle is assumed to have stood at the location of the present south tower, but there is no confirmation of this in terms of building-archaeological data.[4] The only structural features of the gate have been discovered at the side of the southeast tower, but it may have originally been a small sea gate and not the main entrance to the outer bailey.

During the first stage of construction at Kuusisto Castle, there was a small sea gate in the northwest part of outer bailey I, and a large semicircular cannon tower was later built in the middle of the outer bailey, through which there was access to the castle. In the central part of outer bailey II is a large gateway which may be linked to the remains of a tower or smaller fortification structure. There were two sea gates in the outer wall of outer bailey III; the original one was in the northwest wall and the secondary one in the east wall.

In Hämeenlinna Castle the outer bailey came to have a flanking gate tower during the 15th century, but the details of its construction are still unknown.

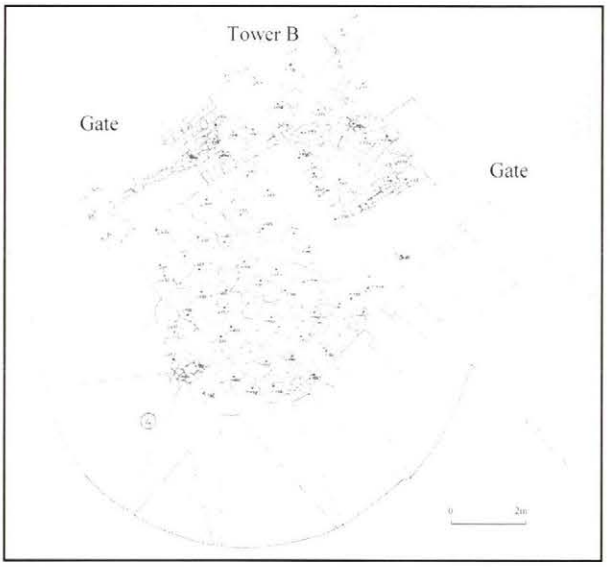

Fig. 92. Tower B (semicircular cannon tower) in Kuusisto Castle. (Archives of the Department of Monuments and Sites, NBA. Kuusisto Castle)

Viipuri Castle had a gate tower facing Turunsilta bridge, but its structures are not known. Access to Raasepori castle appears to have originally been via the barbican tower to the main castle, but later access was moved to the side of the tower. In Kastelholm Castle a secondary gateway/gate tower (projection) was built in the north outer bailey. Access to the outer bailey of Olavinlinna Castle was apparently directly via an opening in the wall. All in all, access to the outer baileys and from them to the main castle is still an open question in many Finnish castles and requires further study.

The semicircular cannon tower of Kuusisto Castle

Among the gate towers of the outer baileys, semicircular gate tower B of Kuusisto Castle is highly exceptional (Figs. 91 and 92). Around the year 1500 low-placed embrasures became common in the Nordic countries;[5] one of the oldest examples of this design is the tower of Kuusisto Castle.[6]

In addition to the low embrasures, the tower has an exceptional entrance. Access through a flanking cannon tower to the castle is rare. Only one similar layout is known from the Baltic regions - Ergeme (Ermes) castle in Latvia where, according to Tuulse, the layout dates from the 1440s.[7] In present-day

[1] The barbican function of tower B was already suggested by Ahrenberg (Ahrenberg 1901, p. 21). See also Tuulse 1956, pp. 383-384.
[2] See Carlsson 1993 pp. 178-183 and Lovén 1996, pp. 157-158.
[3] E.g. McNeill 1996, pp. 98-100.
[4] Gardberg 1959 pp. 72-72 and pp. 150-151.
[5] E.g. Drake 1988, pp. 121-129; Ekroll 1997, pp. 133-134; Gardberg 1993a, pp. 15; Hansson 1976, pp. 333-335; Liebgott 1989, pp. 107-110; Tuulse 1951, pp. 95-97, 158-160.
[6] The early date of the cannon tower at Kuusisto (close of the 15th or beginning of the 16th century) and its low embrasures have been noted for example by Armin Tuulse. Tuulse 1956, pp. 383-384; Tuulse 1957, pp. 126-127.
[7] Tuulse 1942, p. 296.

Poland, only the castle of Siewierz has a partly similar design, in which access to the castle was through a semicircular cannon tower. At Siewierz, the gate structure dates from the second half of the 15th century.[1] Also in the German-speaking countries, a gate structure of this kind in association with a round or semi-circular cannon tower is rare.

For example, Krahe's compendium of over 6,000 German castles mentions, in addition to Ermes, only Rabenstein[2] in Austria (dated to the 12th-14th centuries), Wildo[3] (13th-16th centuries), Ramstein[4] in the Rhineland (14th-15th c.), Reinsberg[5] in Saxony (14th-16th c.) and Schenna[6] in Italy (14th-16th centuries) as having access directly through the tower and at the side, as at Ermes and Kuusisto.[7] The Nordic research literature contains only one parallel, the episcopal castle and residence of Läckö in Sweden, where a semi-circular gate tower stood in the middle section of the south walls of the outer bailey, with access to the castle straight through it. Läckö differs from the above in that the room within the tower is rectangular in plan. It can be suggested that the semi-circular shape is a secondary feature. The outer bailey and tower of Läckö castle are dated to the late 15th century.[8]

In the Finnish research literature, parallels to the gate tower of Kuusisto Castle have been found in other late-15th-century round towers, such as the structures at Raasepori, Olavinlinna and the castle and town walls of Viipuri. Also the tower of Stegeborg Castle in Sweden has been included in this group.[9]

Upon closer inspection, the connections of the round tower of Kuusisto with the above group present a number of problems, as in all the other towers - at least as shown by their present state - there was a walled up space or cellar on the ground floor and the lowest embrasures were in the second or third storey - at any rate several metres above ground level. At Kuusisto, the ground floor space accessed via the gateway had five embrasures and there were several more at a higher level. Here, artillery was fired at ground level, while in the other round towers the embrasures were in the upper parts. At Raasepori, this may be explained by the outer bailey in front of the tower.

I would claim that the closest parallels to the cannon tower of Kuusisto Castle do not appear in the Finnish material until the middle of the 16th century with e.g. the construction of cannon towers in the east outer bailey of Turku Castle and Hämeenlinna Castle.

12.2.5. Routes of access in the baileys

In most medieval castles one of the main elements of defence was the long-term control and surveillance of access to the main castle from the walls and towers (Fig. 90).[10] This would often mean that in passing through the outer bailey the visitor would go through several checkpoints on his way to the main castle — as was arranged for example at Vastselinn (Neuhausen) in Estonia.[11] In Finland, this kind of control of access from the walls of the outer bailey was possible for example at Turku Castle - assuming that the gateway/tower was on the southeast or south side - Hämeenlinna Castle and Kastelholm.

At Kuusisto Castle, it was possible that there was access to outer bailey I through the small sea gate on the northwest side before tower B was built. The gateway of outer bailey II apparently served the harbour and in outer bailey III the two small gates (of different age) were for maintenance purposes.

In Viipuri Castle approaching visitors could be watched and controlled from the outer bailey walls, and access to the main castle was through the two outer baileys. In the first stage of Raasepori Castle, visitors were allowed to come near the walls, but during the 15th and 16th centuries access from the harbour to the main castle required passing through the two outer baileys and the gate tower.

This use of the defensive baileys as routes of access was also common in other castles, although the steep contours of the defensive baileys may have made access difficult in places.[12] Even though there is very little definite evidence, it appears that medieval bailey architecture often included long

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[1] Guerquin 1984, pp. 287-288.
[2] Krahe 1994, p. 481.
[3] Krahe 1994, p. 669.
[4] Krahe 1994, p. 484.
[5] Krahe 1994, p. 498
[6] Krahe 1994, p. 542.
[7] The town wall of Cracow contains at least two barbican towers through which there was access. One was entered directly from the front and the other from the side, as at Kuusisto. The tower with access from the side is dated to the close of the 15th century and the one with direct access to the years 1498-1499. Krassowski 1991, figs. 269 and 271. Cf. Hansson 1976, pp. 174-183, 334
[8] Sigsjö 1988, p. 145 and Lovén 1996, pp. 237-239.
[9] E.g. Drake 1988, pp. 121-129; Gardberg 1993a, pp. 88-89.

[10] For reasons of security, it was necessary to maintain surveillance of persons approaching the castle, but it was also necessary to watch the doings of those leaving the castle. The treasure troves of medieval castles attracted thieves and the castles were also gaols. See e.g. Pounds 1994, pp. 91-101.
[11] Tuulse 1942, p. 306; Lange & Alttoa 1993, p. 121 Abb. 5.
[12] On the control and surveillance of routes of access to European castles, e.g. Krahe 1994, pp. 692-715; Kenyon 1990, pp. 58-82; Lange & Alttoa 1993, pp. 120-121.

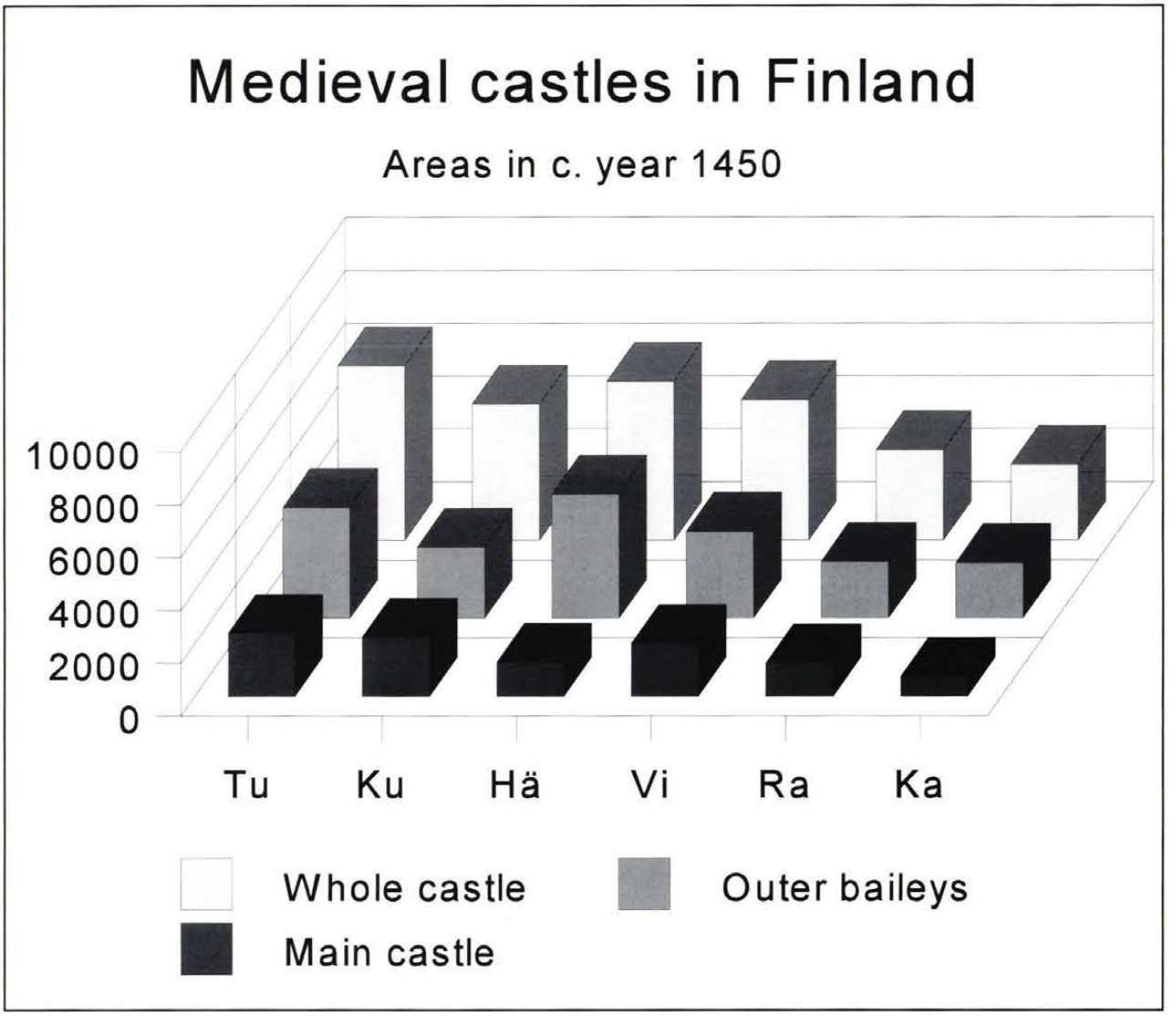

Fig. 93. Areas (m^2) of medieval castles in Finland (main castle and outer bailey) ca. 1450. Tu = Turku Castle; Ku = Kuusisto Castle; Hä = Hämeenlinna Castle; Vi = Viipuri Castle; Ra = Raasepori; Ka = Kastelholm (Drawing by K. Uotila).

detours in the routes of access to the main castle. It is possible that in Finland the direct route of access through the gate tower was not adopted until the turn of the 15th and 16th centuries. The oldest example of this would assumedly have been tower B at Kuusisto Castle.[1] Another example of the construction of a gate tower on a route of access is from the east outer bailey of Turku Castle, where the gate tower in the middle of the east wall was not built until the 1550s.

Aki Pihlman has suggested that the original gate was next to the northeast tower, but there is not any distinct building-archaeological evidence of this.[2]

12.2.6. The palisades

Surviving structures show that the medieval defence arrangements of Finnish castle can be classed into three levels. The top level was that of the walls and towers of the main castle, followed by the bailey walls and towers near the waterline. The third level consisted of timber palisades of several parts, built to surround the outer baileys in shallow water at a distance of 20-30 metres. The height of the posts above the water level has been discussed, but at

[1] It is possible that tower B was preceded by a gateway or tower, but there is no building-archaeological evidence for this. The only indirect indication of the old use of the area as a route of access may be that bored soil samples showed that the cultural/fill layer extended several metres beneath ground level (E.g. Paatonen 1994, pp. 51-52, 60-65).

[2] E.g. Pihlman A. 1994, pp. 76-77.

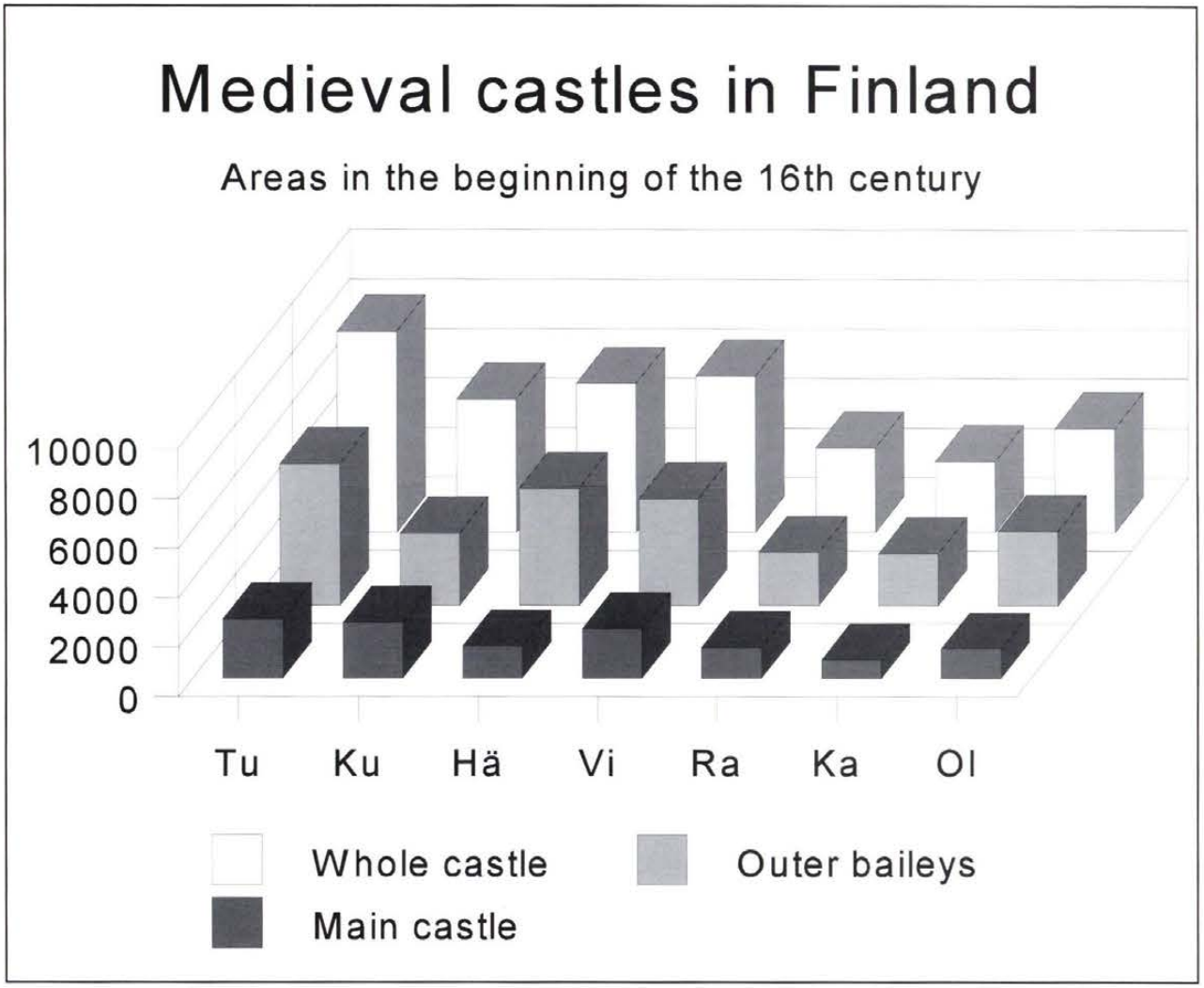

Fig. 94. Areas (m^2) of medieval castles in Finland (main castle and outer bailey) ca. 1520. Tu = Turku Castle; Ku = Kuusisto Castle; Hä = Hämeenlinna Castle; Vi = Viipuri Castle; Ra = Raasepori; Ka = Kastelholm (Drawing by K. Uotila).

least at Kuusisto Castle the shore layers within the palisade indicate that it clearly extended to above the surface.[1] As a result, lagoon-type layers of clay formed within its perimeter.[2] The posts were at leastone metre above the surface, perhaps even more. It was thus a clearly visible defensive structure, a kind of wall of timber. Palisades have so far been found in the environs of the castles of Turku, Kuusisto, Raasepori and Kastelholm, i.e. at all the castles that were on the sea shore. At Turku Castle, some of the palisade structures are dated to early as the beginning of the 14th century and some — in my opinion unjustifiably — to the 1420s. At Kuusisto Castle the palisade can be dated by dendrochronology to ca. 1410 and at Raasepori to ca. 1427. There have been attempts to date the palisade of Kastelholm Castle with various methods, but with no success so far[3].

12.2.7. Summary

I would claim that there are good grounds for dating the early stages of outer bailey architecture to the second half of the 14th century and the early 15th century, when the oldest parts of the outer baileys of Turku, Kuusisto, Hämeenlinna, Raasepori and Kastelholm were built. It is also highly probable that Viipuri castle also had some kind of outer bailey at the time. The only exception is Olavinlinna Castle, which did not come under construction until the close of the 15th century. In the other outer baileys the 15th century first saw work for renovating and raising the walls. Probably around

[1] According to Harry Alopaeus the posts were either at surface level or under the water (e.g. Alopaeus 1994, p.104). On clearly visible palisades, see Drake 1995, figs. 30 and 31.
[2] Wahlberg 1994, pp. 70-71.
[3] On the dating of the palisade at Kastelholm, see Carlsson 1993, p. 108.

the turn of the 15th and 16th centuries foundation problems began to appear in all outer baileys in low-lying locations. These problems led to the disrepair of the outer baileys in the early 16th century. The outer baileys were no longer enlarged at the turn of the 15th and 16th centuries (Figs. 93 and 94).

The site plans and tower designs of the outer baileys indicate a number of groups. The first distinct pair appears to be Turku and Kastelholm. Though of different dimensions, the main castle in both cases was extended with a large outer bailey and there was a defensive bailey protecting the main castle on the more gently sloping side. The similarities include the sloping outer curtain walls of the outer baileys and the locations of the possible gate tower. Kastelholm did not have all the outer bailey towers that were built at Turku Castle, but both sites reveal the same basic features. Chronologically, the outer bailey of Turku Castle is from 1380-1410, while Kastelholm is dated by building archaeologists to the beginning of the 15th century. The only possible difference may be in the zwingers. At Turku Castle, this structure is most probably of the same age as the rest of the outer bailey, while at Kastelholm it is dated, according to the researchers concerned, to a period between the close of the 15th century and first half of the 16th. I would suggest, however, that the southeast outer bailey of Kastelholm Castle was already built in the first half of the 15th century.

The second distinct group consists of the castles of Kuusisto and Raasepori, where also the layouts of the main castles are highly similar. There were similar stages and applied forms in the construction of the outer baileys at both castles, although at Kuusisto more brick was used than at Raasepori. The main differences between the castles are in the outer baileys on the south side. Outer bailey I of Kuusisto Castle has two large secondary towers, with no parallels at Raasepori. Both castles possible had a barbican tower guarding the main entrance, as was possibly the case at Kastelholm. Kuusisto Castle can be definitely dated to the first half of the 15th century, while the outer baileys of Raasepori Castle are from the close of the century , as claimed in the research literature. I would nevertheless entertain the possibility that also the outer baileys of Raasepori Castle were already built during the first decades of the 15th century.

The outer baileys at Hämeenlinna, Viipuri and Olavinlinna castles are all unique in the Finnish material. The parallels to Hämeenlinna Castle are largely found in the Baltic lands and in the areas south of the Baltic sea, although in these parts the later reinforcing of defensive baileys with towers was rare. With regard to Viipuri Castle, the data required for comparison is limited and the parallels and models of the large outer bailey of Olavinlinna Castle are to be found more generally in European castle architecture of the turn of the 15th and 16th centuries.

13. BACKGROUND FACTORS OF OUTER BAILEY CONSTRUCTION AND ARCHITECTURE

The construction of outer baileys was a typical feature of medieval castles in Finland. All the large and middle-sized crown or state castles of Finland and the country's only episcopal castle had outer baileys. In this respect, Finland was not typical of the Swedish realm, for of the twenty or so castles of the crown in Swedish territory only the most important ones, e.g. at Stockholm, Kalmar and Nyköping, included such structures [1]. There was a similar trend in medieval Denmark, although even there the outer baileys were very rare.[2] It can thus be concluded that although Finland belonged to the Nordic Kalmar Union from the close of the 14th century to the early 16th century, the conventions and forms of castle architecture were adopted from elsewhere. With respect to the outer baileys, Finland clearly appeared to have contacts with the south. In the territories of the Teutonic Order in the Baltic lands and to the south of the Baltic Sea, outer baileys similar to the Finnish ones were very common. Large outer baileys, defensive baileys and combinations of these were in use.[3]

Several factors can be suggested as having provided the background for the exceptional extent of outer bailey construction in the medieval castles of Finland. One explanation can be linked to shore displacement in the Baltic and the fact that most of the medieval castles were built on small islands which grew markedly in area during the Middle Ages. The shore areas which thus emerged required fortifications to prevent possible enemies from landing.

A general reason given for the construction of the outer baileys is the need to improve the defence of the castles. The construction stage dated to the second half of the 15th century has often been associated with the rapid development of artillery in the 15th century[4].

A general explanatory model is that the court of the main castle became too small and the household and economic functions had to be moved from the residence of the castellan.

The fourth explanation is that during the course of the Middle Ages, the reliability of the defenders became questionable from the point of view of the castellan (especially the gunners). The former knights had been replaced by mercenaries and these new troops needed large-scale accommodation outside the main castle.[5]

In recent years one of the factors explaining the construction of large outer baileys has been claimed to be the nature of the outer bailey as a trading site or pre-urban settlement (e.g. Stockholm[6]) guarded by the main castle.

A further background factor of outer baileys and castle architecture in general has been found in the general political and military situation of the time. The role of castles in medieval warfare has been actively discussed in recent years. It is an established fact that castles were rarely involved in actual battles and they had a more prominent role as locations for mustering and quartering troops and as centres of administration. It is therefore difficult to link the construction of castles with specific military events. We must also remember that a medieval castle or part thereof was not built quickly; the work always lasted several years.

13.1. Shore Displacement

Data on sea levels in Baltic for instance in the 15th century is important for medieval archaeology. This problem particularly culminates in the construction and layout of outer baileys. The military function of their walls was to guard the adjacent shoreline and to prevent possible invaders from establishing a bridgehead in front of the castle. Therefore, information on medieval sea levels is crucial to outlining the development of outer baileys. Existing shore displacement data has been used in building archaeology to establish chronological back limits. In principle, this chronological criterion is very good, for it can be assumed that medieval unslaked lime mortar could not have been applied in locations under water level or even anywhere close to average water level. This means that, in principle, estimates of water level permit the dating of masonry structures.[7]

[1] In Sweden, extensive repairs of medieval castles and related research have perhaps not been as extensive as in Finland. It is therefore possible that the known distribution of outer baileys in Sweden may change as archaeological investigations extend beyond the main parts of the castles. Cf. Lovén 1996, pp. 57-180, 236-266, 276-347.

[2] On the construction of outer baileys in the Nordic countries, see e.g. Eriksson 1995, pp. 111-152; Ekroll 1997, pp. 131-144; Liebgott 1989, pp. 86-112; Lovén 1996, pp. 57-180, 236-266, 276-347.

[3] On the Baltics, e.g. Alttoa 1993, pp. 11-16; Alttoa & Dubovik 1995, p. 94; Alttoa et al 1996, pp. 14-18; Aluve 1993, pp. 6-7, 95; Dubovik 1993, pp. 38-44; Tuulse 1942, pp. 73-94, 166-181.

[4] E.g. Aluve 1993, pp. 6-7, 95 and Sinisalo 1987, pp. 102-115.

[5] E.g. Hedberg 1994, pp. 61-64; McNeill 1996, p. 106; Tuulse 1942, pp. 73-94, 166-181.

[6] Ödman 1987, pp. 157-186.

[7] Cf. Ödman 1998, pp. 21-33.

There is, however, the problem that the results of traditional geological shore displacement cannot be applied to most medieval sites. As a response to this, a new "fluctuating" interpretation of shore displacement has been developed since the 1980s on the basis of archaeological and other data.

Fluctuating shore displacement may well explain the special features of outer baileys and their construction. To begin with, sea level in Turku and Kuusisto at the turn of the 14th and 15th centuries was clearly below the 2 metre a.s.l. (present sea level) mark, which meant that large areas in front of the old stone castles emerged from the sea. It was thus necessary to build the outermost defensive works at the waterline. The foundation of these walls was clay, which may have dried during the 14th century, but already during construction extensive log foundations were built for e.g. the east outer bailey of Turku Castle. Most of these structures were at clearly lower elevations than suggested by linear shore displacement.

According to fluctuating shore displacement sea level remained stationary until the turn of the 15th and 16th centuries, after which it began to rise. This stationary shoreline may explain why it was no longer necessary to enlarge the outer baileys during the second half of the 15th century.

The rise of sea level that began in the late 15th or early 16th century may be assumed to have presented itself as various structural problems in the outer baileys. Documents tell of the sudden collapse of a curtain wall of Turku Castle in 1505. There is building-archaeological data on sunken and repaired walls in all properly investigated outer baileys.

Researched data on fluctuating shore displacement can be applied to the castles of Turku, Kuusisto, Raasepori and Kastelholm, all of which were on shore and were influenced by fluctuations of sea level. Hämeenlinna and Olavinlinna castles are in the Finnish lake districts and their environment was different. There is no precise data on changes in sea level in the surroundings of Viipuri Castle.[1]

The outer baileys of the castles by the sea can be dated in the case of Turku to the turn of the 14th and 15th centuries and at Kuusisto to the first half of the 15th century at the latest. On the part of Kastelholm the dating of the north wing to the early 15th century also fits the picture, but the dating of its east outer bailey to the turn of the 15th and 16th centuries is more difficult to explain. This structure is roughly located on the two-metre a.s.l. contour, whereby optimum conditions for construction already existed at the turn of the 14th and 15th centuries. Also the disappearance of the east outer bailey during the 16th century may be explained by the fact that it was built at too low an elevation. The rising waters would have eroded its foundations and the bailey would have been torn down in disrepair already in the 16th century. Historical sources tell that at Kastelholm a section of wall in poor conditions had to be torn down in 1504 Perhaps this was the outer bailey that had been damaged by the rising water.[2]

An exception among the castles built by the sea is Raasepori, whose oldest, east, outer bailey was built, according to Drake, in the mid-15th century and the other baileys not until the turn of the 15th and 16th centuries. Fluctuating shore displacement would clearly change the dating of the outer baileys, for we could thus assume that all the outer baileys were built in the low-lying shore area by the beginning of the 15th century at the latest, whereby it was possible to hold the *lagman* assizes of 1427 for example in the south outer bailey. This would have been a considerably better venue for a large meeting than the narrow and steeply contoured east outer bailey. Associated with this suggested chronology is the palisade surrounding Raasepori, which is dendrochronologically dated to the 1420s.

13.2. Artillery

From the 14th century onwards gunpowder and firearms began play an important role in warfare.[3] Earlier research literature has maintained that cannon played a major role in the development of castle architecture since the 14th and 15th centuries. For example, it was long claimed in Sweden that the demolishing and abandonment of castles after the 1430s resulted from the development of offensive artillery.[4]

Recent studies on medieval castles and warfare have questioned earlier claims of the role of artillery in attacks on castles as late as the 15th century. Artillery was already important on the battlefield in the 14th and 15th centuries, but in battles involving castles they mainly had the advantage of producing

[1] Fluctuations in the level of the Baltic and the Gulf of Finland in particular no doubt influenced the construction of Viipuri Castle, although there is no researched evidence of this. See also Saarnisto & Grönlund 1996; Uino 1997, pp. 151-156.

[2] E.g. Carlsson 1993, p. 21; Hausen 1934, p. 22; Törnblom 1996, p. 90.

[3] E.g. Alm 1958, pp. 563-576; Contamine 1993, pp. 194-207; McNeill 1996, p. 188.

[4] E.g. Lönnroth 1940, p. 249; Tuulse 1952, pp. 213-230. In recent studies other reasons than the development of artillery have been suggested for the abandonment of castles in the mid-15th century. E.g. Lovén 1996, p. 203; Törnblom 1996, p. 159.

Fig. 95. The late medieval environs of Turku Castle.
Between the castle and nearby Kakolanmäki hill was an emerging isthmus, which according to geologists did not rise from the sea until the mid-16th century. The archaeological material suggests that there was access from the town to the castle already in the Middle Ages. In terms of defence, the most important nearby location was the rocky Korppolaismäki hill on the opposite shore of the Aurajoki River. The hill, however, was at a distance of over 300 metres, placing it a safe range from medieval artillery. The other nearby rocky hills were at distances of 500-800 metres from the castle. (Elevations contours based on maps from City of Turku. Drawing by K. Uotila)

a great deal of smoke and noise, being thus perhaps more suited to defence than offence. European scholars have refrained from evaluating the precise range or destructive power of medieval artillery, although there are references to many contemporary accounts in which the artillery of attacking troops was brought very close to the defensive walls and gates of castles.[1]

In Sweden, the most extensive work on the early history of artillery is by Jonas Hedberg.[2] According to him, large medieval cannon had a range of approximately 900-1000 metres in direct fire and 1500 metres with a raised trajectory. Smaller cannon had a range of 120-250 metres. A medieval castle could be effectively fired upon from distances of 200-800 metres.[3] In analysing 15th and 16th-century warfare in Sweden and the Baltic region, Hedberg notes that early 16th-century siege cannon could lay waste to a well fortified castle.[4]

There has been research in Finland on medieval artillery, although a few studies have been published in the 1980s and '90s.[5] For example Samuli Paulaharju's research gives a good general idea of the range of cannon from the 17th century onwards, at which stage the average range of an artillery piece was ca. 200-300 metres. Of more importance for the defence of medieval castles was the fact that it was necessary to place the cannon very close to the walls or gates to do any damage.

[1] E.g. Contamine 1993, pp. 191-207; Lovén 1996, p. 38;; McNeill 1992, pp. 102-108, 188; Pounds 1994, pp. 252-255; Weidhagen-Hallerdt 1991 and Weidhagen-Hallerdt 1992. On archaeological perspectives on the study of medieval artillery, see e.g. Törnblom 1996, pp. 88-89.

[2] Hedberg 1994. The study was already completed in 1974 and was reprinted in 1994.

[3] Hedberg 1994, pp. 58-59. Hedberg's suggestions of artillery range following the tradition of earlier studies. For example, both quoted studies on cannon range are from the early years of the 20th century.

[4] Hedberg 1994, pp. 102-119.

[5] Paulaharju 1988 and 1992. On medieval weaponry in general, see Taavitsainen 1980, pp. 18-22 and Taavitsainen 1985, p. 102.

Fig. 96. The environs of Kuusisto Castle in the Middle Ages.
The nearest higher point of elevation was a hill roughly 180-200 metres from the walls and tower B of outer bailey I. The only larger expanse of land in front of the castle was to the southwest of outer bailey I, with clearly dry land also within the 30-metre range. Most of the cannon embrasures of towers A and B and outer bailey I faced this area. In the waters by the shore, the castle was surrounded by a palisade built 35-40 metres from the outer bailey walls. (Source: Archives of the Department of Monuments and Sites, NBA. Kuusisto Castle; The elevation contours marked in the map are based on archaeological and geological interpretations of the original topography. Wahlberg 1994; Uotila 1994. Drawing by K. Uotila).

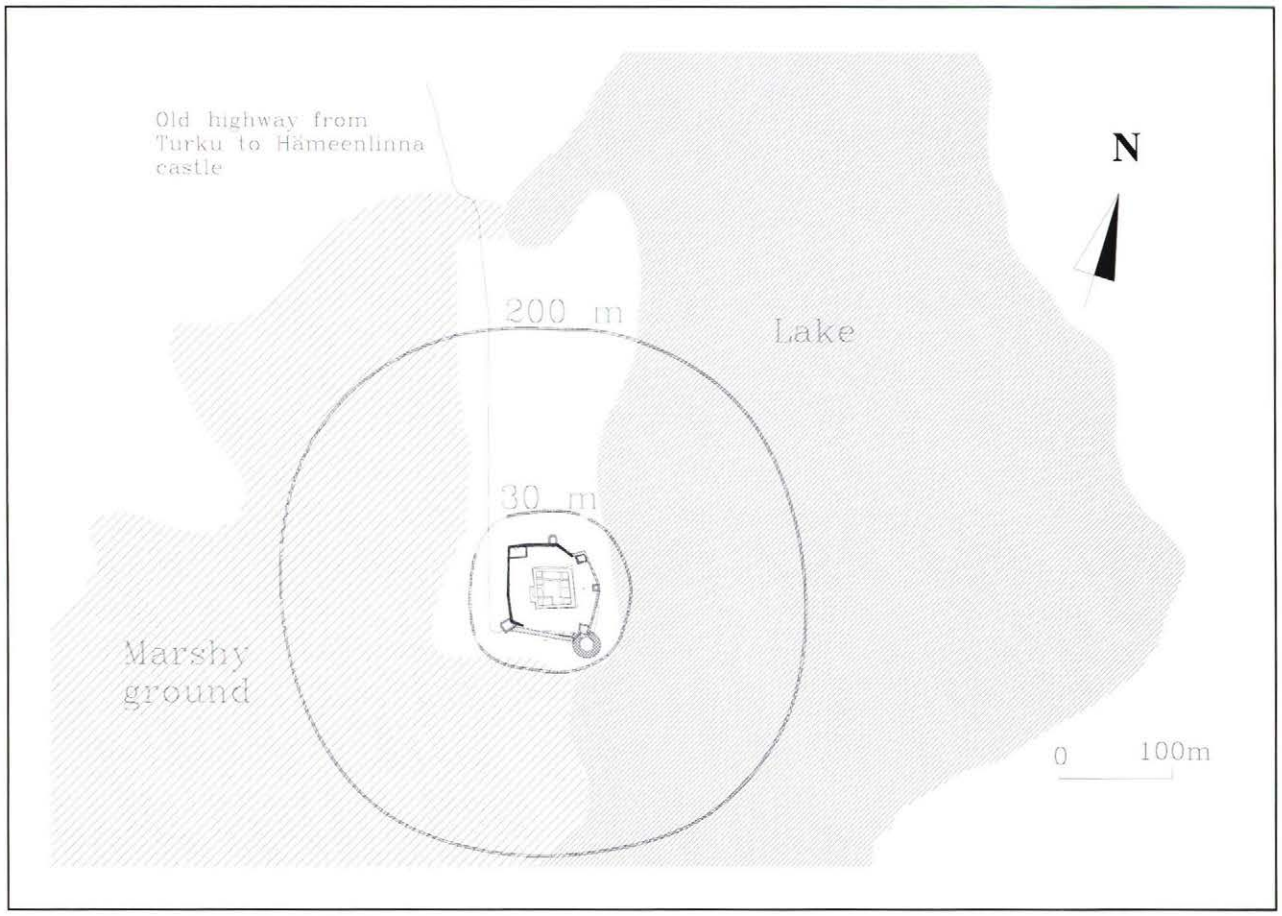

Fig. 97. The environs of Hämeenlinna Castle in the Middle Ages.
In terms of defence, the ridge to the north of the castle clearly posed problems, for it was within cannon range. There were two towers in the north part of the outer bailey, which were intended to improve the defence of the castle towards the north. (Drawing by K. Uotila)

King Christian IV (1588-1648) fired with cannon on the gate of Kalmar Castle from a range of roughly 25 metres. The European research literature contains a great deal of similar information.[1]

According to Paulaharju, artillery fire did not destroy the stones of the walls but their mortar, releasing as firing continued the fill within the wall (mainly sand, clay or moraine). The loss of the fill led to the collapse of the wall.[2] This description of the wall structure, however, does not suit most investigated medieval walls, for the fill within the wall was not earth but a very solid mixture of mortar, stones and brick. Furthermore, some medieval walls — as at Kuusisto — included supporting structures of brickwork within them.[3]

There is no direct evidence of the use of naval artillery to destroy medieval castles and according to the research literature medieval naval cannon were mainly intended to be used against other vessels.[4] There is, however, evidence from Southampton, England, that the towers of the town were built to withstand bombardment by enemy ships.[5] In Sweden there were also cannon-boats built for attacks on castles since the mid-15th century, but their actual fire power is not known.[6]

It is highly interesting to review the medieval castles of Finland with reference to the range of medieval artillery and especially destructive fire. All the medieval castles of Finland were originally built on small islands or headlands, which meant that there was no space left for artillery around them. At Turku Castle, the nearest available area was Korppoolaismäki hill over 300 metres from the

[1] Paulaharju 1992, pp. 168-172. On the locations and shielding of offensive artillery, see e.g. Contamine 1993, pp. 200-201.
[2] Paulaharju 1992, pp. 168, 172.
[3] In many cases the interior parts of medieval walls were very hard. In present-day repairs it is possible to remove the facing stones and the fill within will remain so
Investigations at Kuusisto Castle have revealed a wall structure of a fill of stones, brick and mortar in layers of 30-40 cm remaining in place although the exterior masonry is completely removed (E.g. Heimala & Tapio 1958-1962; Uotila 1990-1997).
[4] E.g. Paulaharju 1992, p. 100; See also Weidhagen-Hallerdt 1992, pp. 88-92.
[5] Hinton 1993, pp. 196-197; On ship-borne mortars, see Contamine 1993, Fig. 22.
[6] Hedberg 1994, pp. 121-129.

east end of the east outer bailey and 400 metres from the main castle, which meant that any artillery from that area would not have had much effect (Fig. 95).

At Kuusisto Castle, the nearest available area was Myllykallio, a hillock situated some 200 metres from outer bailey I, which meant that the latter was also beyond the effective range of cannon. (Fig. 96) Hämeenlinna Castle was surrounded by a lake and marsh, and the nearest point of dry land was over 100 metres to the north of the castle (Fig. 97). In Viipuri, cannon fire from the shore area of the town could reach the castle, but even here it could not have been very effective (Fig. 98).

At Raasepori Castle, the nearest areas of high elevation are on the opposite bank of the Raasepori River at a distance of approximately 100 metres from the castle (Fig. 99). At Kastelholm in turn the nearby high rocky hill was over 200 metres from the castle (Fig. 100) and the situation was much same in Olavinlinna (Fig. 101).

In summary, it can be noted that none of Finland's medieval castles could have been destroyed with medieval artillery. It was possible to interfere with their defence with cannon fire, but even then the cannonballs, flying almost horizontally, would have bounced off the walls of the outer baileys.

The available material shows that very few medieval components or towers of the outer baileys were located to guard the castle or to permit firing on the nearest cannon emplacement of an attacking enemy. At Kuusisto Castle, the semi-circular cannon tower was on the line between Myllykallio hill and the south entrance to the main castle, but it was also possible to monitor and control the low-lying area in front of the castle from the embrasures of the tower. The tower may thus have been erected to dispel an attack. At Hämeenlinna Castle, the Fatabur tower may have been situated to defend against cannon on the north side, but according to surviving information it does not appear to have a cannon tower as such. At Viipuri Castle, the outer baileys were primarily built on the side facing the town of Viipuri and were probably not related to enemy artillery. The towers of the south outer bailey could have been built to counter fire from the hill to the southwest, as also the large round tower of the main castle.

It appears that artillery played only a modest role as an offensive weapon against castles and was obviously a secondary concern in the construction of outer baileys and feature that did not begin to influence defence measures until the turn of the

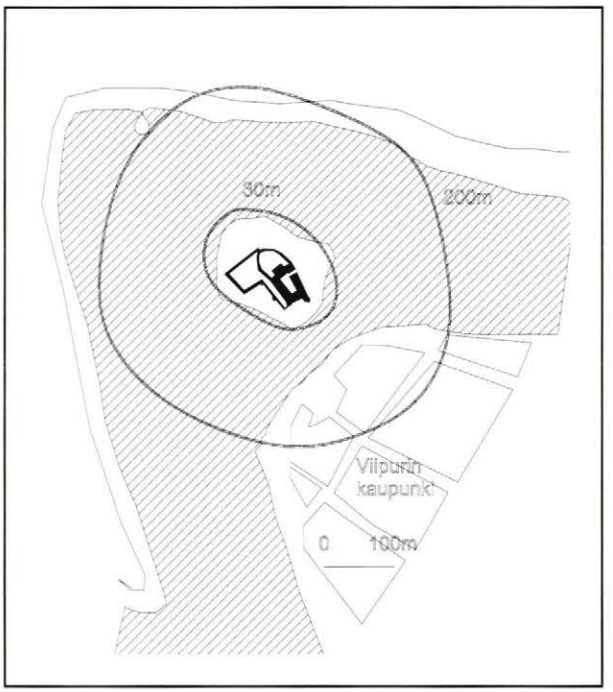

Fig. 98. The environs of Viipuri Castle in the Middle Ages.
The outer bailey of Viipuri Castle was well guarded from cannon fire, while the main castle could be fired upon from the town, where there was a high hill at a distance of less than 200 metres from the main castle, permitting, in principle, cannon fire on the castle (Drawing by K. Uotila).

15th and 16th centuries.[1] A similar picture is provided by medieval and 16th-century warfare in Finland.[2] It was very rare for the castles to be involved in such events and the destruction of castles with artillery fire did begin to appear until the 16th century. The first occasions in Finland were battles fought in the 1520s,[3] when for instance Swedish troops bombarded Kuusisto Castle, after which it was easily taken from its Danish occupants.[4] Historical sources clearly show that the use of artillery as siege weapons did not spread until the 16th century, when new forms of bailey archi-

[1] On the development of defensive artillery and its significance for the various structures of castles, see e.g. Liebgott 1989, p. 105; McNeill 1996, pp. 102-108; Törnblom 1996, pp. 110-111, 159.

[2] The actual defensive capabilities of Finnish castles were rarely tested during the Middle Ages. See Lovén 1996, pp. 38-42. On the role of castles in medieval warfare, see e.g. Pounds 1994, pp. 26-53.

[3] The border town of Viipuri first came under artillery siege in 1495 (e.g. Gardberg 1993a, pp. 71-73; Paulaharju 1992, p. 24; Suvanto 1985, p. 169). In Sweden artillery already played a significant role in battles in the 1510s (Hedberg 1994, pp. 102-123).

[4] E.g. Gardberg 1993a, pp. 127; Hausen 1881, pp. 33-34.

Fig. 99. Environs of Raasepori Castle in the Middle Ages.
The location of the castle among high rocky hills was difficult in terms of defence, for the castle could be fired upon with cannon from several directions.(Material from the Archives of the Department of Monuments and Sites, NBA. Raasepori. Drawing by K. Uotila)

tecture were introduced (e.g. round cannon towers and bastions).[1]

In summary it can be said that medieval outer bailey architecture does not appear to have had any connection with the development of artillery in the 14th and 15th centuries. Artillery did not become animportant offensive weapon in Finland until the16th century, i.e. roughly 100-150 years after the outer baileys of the castles were built.[2]

13.3. Requirements of space in castles

The medieval castle — such as Turku Castle — is assumed to have developed in a succession of stages. At first, the main castle was built and divided into two sections, the chatelain's residence and the household ward. Over time, the residential section expanded and it became necessary to move the household ward outside the castle area, for which purpose the outer bailey was built. This suggested course of events is argued for with reference to observations of the division of the main castle into two parts, which are no doubt correct. It is, however, a completely different matter to what degree the outer baileys actually served as household wards.

With reference to two completely different types of outer baileys, I feel it can be suggested that at

[1] Cf. Hansson 1976, pp. 333-335; Hedberg 1994, pp. 130-132; Liebgott 1989, pp. 107-110; Tuulse 1951, pp. 95-97, 158-160.
[2] Neither did the missile weapons preceding artillery play any major role, for their range (75-125 m) was so short as to preclude any major problems for medieval castles in Finland. E.g. Hedberg 1994, p. 13; Paulaharju 1992, pp. 9-10; Weidhagen-Hallerdt 1991, pp. 92-93.

Fig. 100. Medieval environs of Kastelholm Castle.
The map shows sea level according to the present 2-metre a.s.l. contour, which corresponds to sea level in the area in the Late Middle Ages and 16th century. The castle most probably included, in addition to the present structures, a lower southeast outer bailey, which extended to the south and southeast sides of the main castle. The most problematic area for the defence of the castle was a high hill on the southeast side, from where the castle could be fired upon. The southeast outer bailey was intended to improve the defence of this quarter (Material from Carlsson 1993. Drawing by K. Uotila).

least the defensive baileys were intended solely for the defence of the castle. The baileys as such (at Turku, Viipuri, Kastelholm and Olavinlinna) may have originally included the function of household ward, but at least in Turku Castle the archaeological material precludes any intensive use of the area in the early stages. Most of the north section of the ward was excavated in the 1980s, but only a few buildings were revealed.[1] It appears that the ward area stood empty throughout the Middle Ages. This is also suggested by the fact that when the construction of outer baileys came under way in the 14th and 15th centuries, the courts or wards of the main castles were mainly unbuilt. At Kuusisto for instance, the main castle area was never built full of masonry structures. Here, the whole north section was either empty or contained only wooden buildings for household and auxiliary purposes. Despite this, the castle had three outer baileys.

It appears that lack of space in the main castle was not an important factor. The construction of outer baileys may have been associated with a more general division of the household functions into various parts, whereby the castle would have a

[1] E.g. Kykyri 1994, pp. 83-87 and Pihlman 1994 A., pp.74-77.

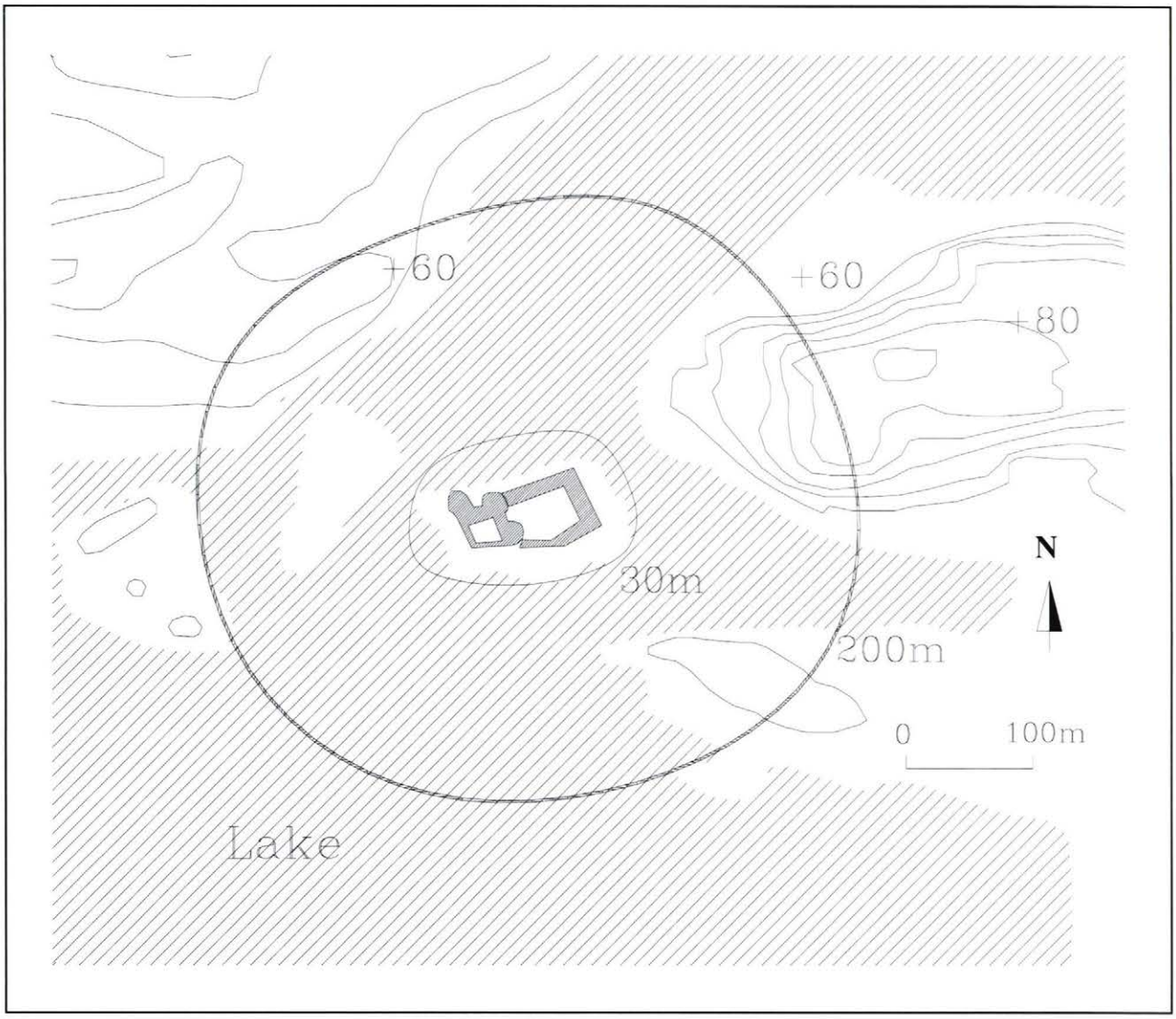

Fig. 101. Environs of Olavinlinna Castle in the Middle Ages.
The walls of the main castle and outer bailey cover the whole small island of the site. Within cannon range, however, was nearby Tallisaari island and large tracts of land on both sides of nearby Kyrönsalmi strait (Material from the Archives of the Department of Monuments and Sites, NBA. Olavinlinna. Drawing by K. Uotila).

garden[1] (cabbage field) in one outer bailey, a smithy in another, and a slaughtering area in a third one.[2]

13.4. Accommodation and Quarters for Mercenaries

During the 15th century, large outer baileys were built in castles of the Teutonic Order in the Baltic lands. These have been assumed to have served increased needs for accommodation in the castle areas. The development of weaponry, and artillery in particular, introduced mercenaries into the castles in addition to the chatelain's own troops. The trustworthiness of the former was questionable. Large outer baileys and accommodation facilities were built to house the mercenaries and to keep them under surveillance.[3]

In Finland, similar large outer baileys were built in the castles of Turku, Viipuri, Kastelholm and Olavinlinna. Since Viipuri, Kastelholm and Olavinlinna are also dated to the 15th century it can be suggested in principle that some kind of accommodation for mercenaries was arranged.

[1] On the garden and medicinal plants of castles, see e.g. Aalto 1994, pp. 21-38; Lempiäinen 1994, pp. 80-90.

[2] On the household functions of outer baileys, see e.g. McNeill 1996, pp. 80-81 and Mogren 1995, p. 176. On the gardens of medieval castles, see Roslund 1995, pp. 150-155.

[3] E.g. Hedberg 1994, pp. 61-64; McNeill 1996, p. 106. Archaeological data suggest that the outer baileys were used for the housing and maintenance of soldiers. Accordingly, the main castle was the living environment of women. E.g. Svensson 1996, pp. 215-217. On the position of women in castles, see Andersson E. 1996, pp. 209-217; Vilkuna 1996a, pp. 220-221.

There is, however, the problem that Finnish castles lack permanent accommodation facilities - or such have not been found.

The outer baileys of Kuusisto Castle can mainly be regarded as defensive baileys which need not have included quarters. In the 1980s a large wooden building was revealed in the excavations of the ward of outer bailey II; a large number of 14th and 15th-century coins were found in the immediate vicinity.[1]

In the west part of outer bailey II was a large masonry structure, which may also have been part of accommodation facilities. They may point to the exceptional use of this location, for instance in quartering mercenaries.

It can also be assumed that the outer baileys may reveal distinct military areas — for example through finds — if investigations are continued with field work and the analysis of material already excavated.

At Turku Castle, the first stage of constructing the outer bailey in the 1380s is associated with a period when — according to historians — an exceptionally large number of German mercenaries were in the country.[2] Perhaps one of the reasons for building a large outer bailey was the need to accommodate troops.

13.5. Protection of the Local Populace

In his studies on the Castle of Stockholm, Anders Ödman concluded the urban settlement of Stockholm originated within the walls of the castle's large outer bailey.[3] This purportedly involved locating an urban settlement under royal authority at the foot of the castle, making it possible to control and protect it. Unlike the actual town, the outer bailey could also house a market or trading site.[4]

In Finland, there were large outer baileys only at Turku and Viipuri. Regarding the latter, it has long been suggested that the urban settlement of Viipuri was originally at the castle site and that the local burghers resided within the castle walls well into the 14th century[5]. There is, however, the problem that the outer bailey walls have been dated in studies to the 15th century, by which time the town of Viipuri had already emerged on the shore of the adjacent strait. If the outer bailey of the castle of Stockholm had actually included a small community of burghers, we may in principle assume that a similar community could have existed next to Viipuri Castle in its highly dangerous location.

The large east outer bailey of Turku Castle has not revealed a single item of building-archaeological data suggesting stone buildings as in Stockholm, where several stone buildings were discovered within the castle walls. Recent studies, however, have pointed to the late-13th-century urban-type manner of construction of Turku Castle[6], but its connection with the outer bailey appears highly unlikely, for the masonry parts of the outer bailey were not built until the 1380s, i.e. roughly a century after the claimed urban stage of the main castle. When work began on the east bailey in the 1380s, the town of Turku, some kilometres upstream from the castle already had a cathedral nearly a hundred years old and urban settlement. Accordingly, there is no historical background to support the suggested links of the outer bailey with an urban context.

One possible reason for the construction of an outer bailey may have been the desire or need of the lord of the castle to protect his tenants and subordinates from enemy attack.[7] In Finland, the best example of this would be Kuusisto Castle, with its large area of outer baileys (almost 4,000 sq.m.). Since the founding of the castle almost all of the island of Kuusisto and its twelve hamlets belonged to the Bishop of Turku, and during the Middle Ages more land and tenants were obtained for the episcopal *mensa* in the areas around Piikkiönlahti bay in the vicinity of the castle.[8] It can be assumed that the outer baileys built in the 15th century were places of refuge for the bishop's tenants during times of war and unrest, even though this is not attested in historical sources. This would have been a continuation of the hillfort tradition into the context of medieval castles.[9]

A review of the routes of access to medieval castles shows that access was often via the gate tower or the area in flanking the wall. This defensive consideration had a reverse aspect, for while access could be controlled it was also possible to keep an eye on who left the castle. The Finnish material contains no direct medieval sources telling, for example, how many people could work in

[1] Suna 1994b, pp. 14-16.
[2] E.g. Suvanto 1985, pp. 105-109.
[3] Ödman 1987, pp. 157-186. Cf. Lovén 1996, pp. 85-90. See also McNeill 1996, pp. 84-86.
[4] Mogren 1995, p. 176. See also Drake 1994c, p. 132.
[5] E.g. Gardberg 1993a, pp. 66-68.
[6] Drake 1996a.
[7] On relations between these parties in England, see e.g. McNeill 1996, pp. 82-84.
[8] On the relationship between Kuusisto Castle and its environs, see Uotila 1995, pp 48-51.
A Swedish example of protecting the local populace is the castle of Läckö from 1505. Lovén 1996 p. 29.
[9] On the dating and historical background, see e.g. Taavitsainen 1990, wich a critical view of ancient hillforts as places of refuge.

different capacities in castles. It is, however, highly possible that at least some of the young people of the vicinity work against their will in the local castle.[1] I feel it can be suggested that the period of outer bailey construction dated to the turn of the 14th and 15th centuries may be associated with a broader trend in society involving the control of servants and the rural populace. The walls of the outer baileys can also be viewed as closing the castle courtyard, thereby preventing servants forced to work at the castle and the convicts incarcerated there from fleeing.

13.6. Political Events

The construction of medieval castles in Finland has often been placed in a broader historical framework used to seek keys to the actual history of construction of the castles. For example, the first period of castle construction at the turn of 13th and 14th centuries has been linked to the overall political situation in the Baltic regions and Sweden's position in the struggle over the domination of Finland. The second period of castle building at the close of the 14th century is linked to contemporary political unrest and the emergence of the Kalmar Union. The third period is dated to the second half of the 15th century and is associated with the growing threat from the east.[2] Recent studies, however, have questioned many of the political factors and historical events claimed as the background of castle building.[3]

Although the building of the outer baileys was only part of the overall process of construction or renewal of a whole castle, the available precise dates make it possible to view the castle building process in relation to the contemporary political background. The following section discusses the dendrochronological results for the outer baileys at Turku, Kuusisto and Raasepori and accordingly the political background and events associated with their construction.

Turku Castle

At Turku Castle, precise dendrochronological dates are available for the east outer bailey, which came under construction in the years 1381-1383. Turku Castle had been possibly damaged in a siege in 1364-65 and one of its stages of construction has traditionally been placed in the period following the siege.[4] It can be assumed that construction began in the main castle in the 1360s and 1370s and by the 1380s it was possible to begin work on the outer bailey, which was modelled after German examples. At the time, highest political authority in Finland was in the hands of Bo Jonsson Grip and Jacob Abrahamsson Djäkn became bailiff of Turku Castle in 1377.

The beginning of work on the outer bailey is associated with a time when Swedish noblemen led by Bo Jonsson Grip struggled over power with the King of Sweden, Albrecht of Mecklenburg, but conditions in Finland were peaceful. Falling into the same period as the outer bailey at Turku are for instance the earliest stages of building at the castles of Raasepori and Kastelholm. It is highly possible that the work had not been completed when Bo Jonsson Grip died in 1386 and his bailiff, or advocate, Jacob Djäkn sided with the king. In this connection, in 1387, Djäkn was awarded rights to large fiefdoms in western Finland.[5]

I feel there is a basis to claiming that original construction plan of the outer baileys included the whole east part and the upper south section. Work on the north wing of the east outer bailey was halted, however, in the 1380s and '90s and it did not continue until after 1400. This may have been due to the extremely poor foundation conditions in the

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[1] E.g. Vilkuna 1996a.

[2] On the three periods or stages of building medieval castles in Finland, see e.g. Drake 1985, p. 137; Gardberg 1987, pp. 37-47 , Gardberg 1993a, pp. 10-15; Sinisalo 1987, pp. 102-115.

[3] For example Iikka Kronqvist's way of linking the architectural history of Turku Castle with certain historical events has been critically reviewed in recent studies (e.g. Drake 1994a; cf. Gardberg 1995). Lena Törnblom, for example, has questioned the role of the Russian threat as a reason for castle building in the 15th century (Törnblom 1992, pp. 393 and Törnblom 1996, p. 62). In addition to the castles, a distinct progression of stages has also been suggested for the medieval churches of Finland (e.g. Gardberg 1987, pp. 48-65 and Sinisalo 1987, pp. 67-99). Recent studies have also critically reviewed the earlier suggestion that churches were built over the course of centuries (e.g. Hiekkanen 1994).

[4] The siege of Turku Castle in 1364-65 and related events have been one of the cornerstones of the architectural history of the castle. For example, Iikka Kronqvist suggested that the castle's third major stage of construction began after the siege, in which considerable damage had occurred (Kronqvist 1947, pp. 57-58, see also Gardberg 1993, p. 30; Kostet 1997, p. 19; Vahtola 1988, p. 77).

In a later connection Knut Drake has suggested that the castle could have surrendered after a siege of nine months without incurring any major damage (e.g. Drake 1994a, pp.54-56 and Drake 1997b, p. 45). It is, however, difficult to image how a medieval castle could have been spared at least some kind of damage during nine months of siege warfare.

[5] On the political situation of the 1380s, see e.g. Jaakkola 1944, pp. 439-453, 465-474; Kuujo 1981, pp. 19-20; Suvanto 1985, pp. 107-109; Vahtola 1988, p. 80.

north section, which slowed or stopped work for a few years.

Another possible explanatory factor is a crisis involving control of Finland and Turku Castle that heightened in 1395. We may assume that between 1395 and 1398, the administration and economy of Turku Castle were in considerable difficulties especially because of the attacks of the so-called Victuallers. It was not until conditions calmed down after 1398 that work could again be continued in the outer bailey.[1]

Raasepori

Dendrochronological results are available on the encircling palisade of Raasepori Castle. According to this data, the timber was felled during the winter of 1426/27. The oldest written reference to the outer bailey dates from February 1427.

A new commandant, Otto Pogwisch. was appointed to Raasepori in 1426, and it can be assumed that improvements to the defences, with the erection of an extensive palisade, were among the first measures taken by the new chatelain.[2] Work on the actual baileys must have come under way already before Pogwisch took office, for it was hardly possible to build a whole outer bailey during the summer of 1426.

As at Turku Castle, the work here may have involved the construction of a larger fortification, which can be assumed to have begun in the late 14th century with the erection of the walls and buildings. From these locations, work progressed during the early years of the 15th century to the outer bailey. The last stage, in the 1420s, involved the outermost defences, the palisade driven in the waters surrounding the castle.

At the time of construction of the palisade (1427) the Swedish realm was at war. In 1426 the so-called Vendian War of Sweden's King Erik of Pomerania broke out against the southern towns of the Hanseatic League. We can assume that the fortification of Raasepori was associated with this crisis, although no battles were waged in Finland. Immediately upon the outbreak of hostilities, the commandants of Raasepori and Kastelholm inquired about the position of Tallinn regarding the war, which suggests that the war was regarded as a very real problem. In the years 1428-1430, privateers of Lübeck sailed in the waters off Tallinn, but there is no information on their possible attacks on Finland.[3]

Kuusisto Castle

An exceptionally large body dendrochronological data is available on Kuusisto Castle. So far two masonry components and the palisade have been dated.

The oldest dates are from the palisade encircling the castle. One of the samples is from early as 1401/02, but of the palisade timber was felled during 1410 and 1411.[4] The spring of 1411 was a time of battles in the east. In March 1411 the troops of Viipuri Castle took Tiurinlinna fort and later in the same month the Novgorodians attacked the town of Viipuri.[5] According to some experts it is also possible that the Novgorodians extended their attacks all the way to Turku.[6] The construction of the palisade in conjunction with the crisis in the east does not necessarily prove that the Russians attacked Turku, but it may indicate that some fortificatory measures were taken even at Kuusisto Castle.

In other words, improvements to the defensive structures of Kuusisto Castle were already begun when Bishop Magnus II Tavast took office in 1412. During the term of the latter, additional construction at Kuusisto was speeded and for the first time the bishop refers to the structure as "castrum", in the 1410s and 1420s.[7] The latest dendrochronological dates for the outer bailey tower and wall are from the close of the 1430s. In the case of Kuusisto Castle there are grounds to assume that the new building work came under way in the main castle in the 1410s-30s, expanding to the outer bailey in 1436, where they continued until the 1440s.

During the 1430s Finland and its bishop contended with various kinds of turmoil. Unrest that had long been brewing in Sweden erupted in the so-called Engelbrekt uprising of 1434. In Finland the rebellion drew adherents only in Ostrobothnia and the Åland Islands. Many castles in Sweden were easily taken by the insurgents. Perhaps the quick

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[1] On the restless conditions of the 1390s and the Victuallers, see e.g. Jaakkola 1944, pp. 486-487; Kallioinen 1995b, pp. 17-34; Kuujo 1981, pp. 20-21 and 179; Suvanto 1985, pp. 131-133.

[2] E.g. Gardberg 1993a, pp. 85-86; Salminen 1994, p. 635.

[3] Jaakkola 1950, pp. 212-226; Suvanto 1985, p. 139; Vahtola 1988, p. 93.

[4] Bishop Bero II Balk was still in office at the time. Bishop Bero died at Kuusisto in the summer of 1412. (e.g. Juusten 1988, p. 44; Palola 1997 p. 152)

[5] E.g. Jaakkola 1950, pp. 165-167.

[6] Juusten 1988, p. 44, in which it is mentioned that the Russians caused considerable damage to Turku Cathedral. See Kuujo 1981, pp. 179-180; Rinne 1941, pp. 57-58; Suvanto 1985, p. 139.

[7] FMU 1884; e.g. Gardberg 1993a, p. 124.

loss of these castles and their weak defences led to fortificatory improvements also in Finland.[1]

In 1435 and 1436 the leaders of Finland sided with the opponents of the king and in the autumn of 1436 Karl Knutsson became the real head of the country.[2] This unequivocal break with the king possibly steered the actions of Bishop Magnus II Tavast with the result that it was decided to begin work on the outer bailey during the winter 1436-37.

In 1438 relations with monarch were restored, but in the autumn of the same year the so-called David uprising broke out in the Finnish province of Satakunta. When Bishop Magnus II Tavast was at a meeting of reconciliation in Lempäälä parish, work was begun on the foundation of outer bailey II of Kuusisto Castle.[3]

Summary

The history of Finland's medieval castles and related events of domestic and foreign policy will be outlined in further detail as research progresses. We are now obtaining almost on a yearly basis new and more precise dates for the various castles.

In the case of Turku Castle, the beginning of the construction of the outer bailey in the early 1380s is clearly associated with the fortification programme of Bo Jonsson Grip and Jakob Djäkn, but it has no immediate basis in contemporary day-to-day political events.

At Raasepori, the construction of the palisade to encircle an otherwise completed castle may have been a completely independent undertaking. This stage, however, is associated with the arrival of a new commandant and the growing threat of war and unrest, which means that construction work may have had immediate underlying causes.

At Kuusisto it is interesting to note with reference to all three accurately dated building remains that work was begun each time when crises were at their worst. The 1411 attack of the Novgorodians may have been a fait accompli when the posts of the palisade were driven on the spring ice. In 1437 work began on the foundation of a masonry tower when the Nordic Kalmar Union was already in a state of collapse. Political crisis and the David rebellion were in fact in the past when work was begun in earnest on the walls of outer bailey II. I would claim that these facts suggest that the construction of the castles was something separate from day-to-day political events and always involved long-term projects, to which political change could naturally introduce new features, but which were not necessarily set in motion by political developments.

Instead of the three major periods of castle building claimed in earlier studies we can now maintain that the building of the outer baileys was a clearly more diffuse phenomenon, which began in the late 14th century and continued all the way to the 1440s.

The new stage of fortification that begun in the 1470s did not necessarily concern at least most of the outer baileys. Here, the main alterations and repairs were not carried out until the turn of the 15th and 16th centuries and they were due to the rapid deterioration of the castles and not to any political developments.

The significance of the numerous outer baileys of the Finnish castles in actual warfare was not demonstrate until the battles of the 16th century, which they had to withstand in poor and already obsolete condition. By that stage the weaknesses of castle-based defence had been revealed and Finland moved rapidly from the hands of one ruler to another.

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[1] On the Engelbrekt uprising, e.g. Enemark 1986, pp. 40-43; Jaakkola 1950, pp. 412-425; Suvanto 1985, pp. 140-143; Vahtola 1988, pp. 93-94. On the weak defensive capabilities of Swedish castles, see e.g. Lovén 1996, pp. 206-207.

[2] E.g. Jaakkola 1950, pp. 433-506; Suvanto 1985, p. 143; Vahtola 1988, pp. 94-95.

[3] E.g. Jaakkola 1950, pp. 519-527; Salminen 1995, pp. 26-39; Suvanto 1985, pp. 143-147; Palola 1997, pp. 297-300.

14. CONCLUDING REMARKS

The early stage of the construction of outer baileys in the medieval castles of Finland can be dated to the 14th century. It is definitely known that parts of the outer bailey of Turku Castle and possibly parts of the outer baileys of Hämeenlinna and Kuusisto were built at that time.

By the early 15th century, building activities had picked up to such a degree that the castles of Turku, Kuusisto, Hämeenlinna, Viipuri, Raasepori and Kastelholm had outer baileys by the middle of the 15th century at the latest. By that time the outer bailey had largely reached their medieval extent.

During the second half of the 15th century, the building of the outer baileys was mainly involved with raising the height of walls and towers and the construction of new towers. At the turn of the 15th and 16th centuries, the only new outer bailey was the completely built one at Olavinlinna Castle. At the other outer baileys it was necessary to contend with disintegrating walls and towers, for changing conditions in the environment led to foundation problems in all the castles on the coast.

One reason for the construction of the outer baileys may have been considerable fluctuations of sea level in the Middle Ages. During the 14th century, sea levels sank very rapidly, for example at Turku to below the present 2 metre a.s.l. contour, which revealed large shore areas in front of the castles that had to be fortified. When sea level began to rise at the turn of the 15th and 16th centuries, the foundations of the now century-old structures began to give way and the defensive capabilities of many castles were decisively weakened as the walls of the outer baileys collapsed. The poor condition of the castles may partly explain their minor tole in early 16th-century warfare.

Earlier studies have underlined the role of artillery as an offensive weapon in the Middle Ages. We can suggest, however, that offensive artillery did not play any significant role in the conquest of castles until the 16th century. The new concepts of defence pointing to this emerged in the construction of new cannon towers, the first of which was the semicircular cannon tower of Kuusisto Castle from the first decades of 16th century.

Lack of space in the main castles was not a reason for the construction of the outer baileys, for most of the main castles were still spaciously built at the turn of the 14th and 15th centuries. It is possible that also in Finland new forms of castle-related culture formed emerged with the outer bailey walls, such as gardens and cabbage field, which are known for example from Turku Castle in the 1460s. It is also possible that at least the largest outer baileys (Turku, Viipuri and Kastelholm) came to have large outer baileys for quartering unreliable foreign mercenaries and keeping them apart from the troops and servants of the castle. It is difficult, however, to imagine that a town or protected trading site was connected with the outer bailey. Viipuri is the only place where this was possible, but even there the outer bailey is younger than the actual town.

The connections of outer bailey architecture are clearly in a southern direction, mainly in the Baltic lands and other territories of the Teutonic Order. The present material shows that there are few links with Sweden and other parts of Scandinavia. There were, for example, in Sweden only a few large outer baileys and no defensive baileys shielding the main castle. Politically, late medieval Finland was linked to the West (the Kalmar Union), but the techniques and forms of castle architecture came from the regions of the Teutonic Order in the south.

The early stages of outer bailey architecture are clearly associated with the unrest of the second half of the 14th century, but there are no grounds to view these structures apart from the rest of castle architecture. The construction of outer baileys in the various castles was clearly part of a large building schemes, involving the main castle and often the construction or restoration of the bailey. The construction of outer baileys falls in the second major period of castle building in Finland, which has long been dated to the second half of the 14th century in the literature. It is possible that in the main castles work progressed faster and they were completed by the close of the 14th century. The outer baileys were possibly built at a slower pace and their completion to their final medieval extent may have lasted until the first half of the 15th century, possibly into the 1430s — 1440s. The continuation of outer bailey construction at various sites well into the 15th century suggests that the second half of the 14th century was not a turning point in castle architecture but the active initial phase of an extensive stage of building for defensive purposes (Fig. 102).[1]

The period of outer bailey construction dated to the first half of the 15th century in Finland appears exceptional in the context of the medieval Swedish realm. According to Lovén's studies, Sweden underwent three major periods of construction, one of which ended around 1400 and the third grew to significance towards the end of the 15th century.

[1] Cf. Drake 1996b.

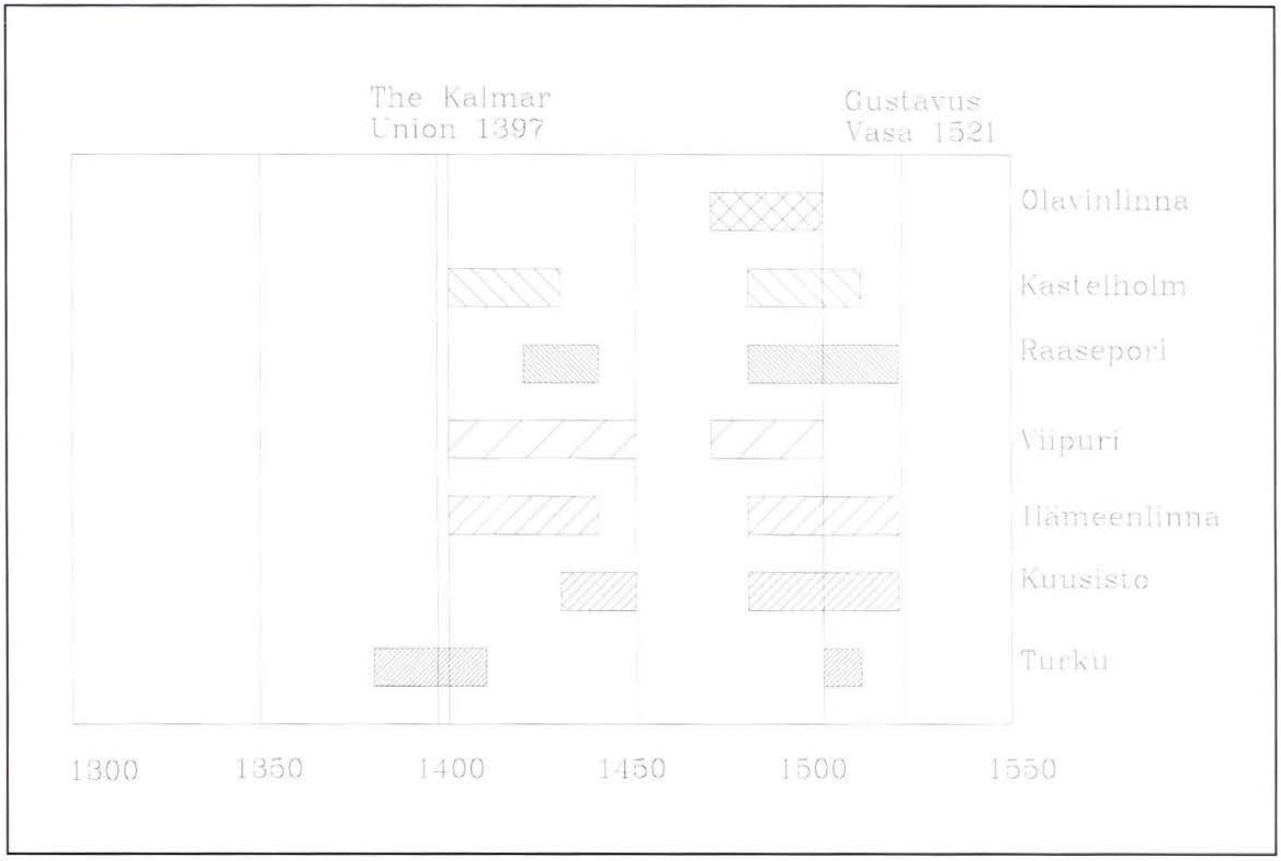

Fig. 102. The construction of outer baileys in Finnish medieval castles.
The results of the study show that the construction of outer baileys at castles came under way in the late 14th century and continued until the close of the 1440s, although the most active building period may be placed in the early years of the 15th century. After the first building stage, most of the outer baileys reached their medieval extent.
A second period of extensive building can be dated to the second half of the 15th century, mainly beginning in the 1470s. With regard to the outer baileys, the most active period was in the first years of the 16th century, which involved the introduction of new components (round and polygonal towers) and repairs to existing structures. Construction was halted in the 1520s when King Gustavus Vasa ascended to the throne and was not resumed until the mid-16th century.

peaceful period in castle construction.[1] A possible explanation for the exceptional time of construction of the Finnish outer baileys may be that they were built after the other parts of the castles were completed. It is also possible that our concept of three distinct cycles of castle building is exaggerated and that castles and their components in particular were built throughout the 15th century.

It is interesting to assume that after the castles were completed by the middle of the 15th century at the latest, economic resources and building skills became available for other works. Such works need not be sought from afar, for recent studies show that an extensive process of church building in stone began around the middle of the 15th century and continued until the 16th century.[2] It can be assumed that after the years of risk and peril of the close of the 14th century the authorities first decided to improve defences, after which resources were channelled into ecclesiastical building projects.

The third period of castle building began in the second half of the 15th century, when all the old castles underwent renovations and Olavinlinna Castle and the town wall of Viipuri were built. At this stage the walls of the outer bailey were apparently raised apace with the storeys of the main castle, and secondary towers were added to a few outer baileys. In Finland, the third period of construction has been linked to the emerging threat of the east, which was no doubt one of the main overall reasons for building castles - at least in eastern Finland.

During the building stage of the second half of the 15th century, the old outer baileys were renewed, but there were no significant new works. At this stage, artillery was mainly used as a defensive weapon to dispel attacking troops.

[1] Lovén 1996, p. 209.
[2] E.g. Hiekkanen 1994, pp. 217-25. See also Palola 1997, p. 299.

The foundation conditions of the castles had changed by the turn of the 15th and 16th century, possibly as a result of rising water level in the Baltic. The outer baileys on the coast that had been built on clayey soil quickly began to deteriorate and partly even collapse. The early years of the 16th century are a period of collapsing walls and their rapid repairs, with which deterioration was slowed. During the 16th century, the first actual cannon towers began to be built for defence against attacking artillery.

Amidst the unrest of the times, dwindling resources also had to be channelled into repairing the collapsing outer baileys, although the military weaknesses of the castles had already come to light in the early years of the 16th century. At that stage, Danish troops took Kastelholm Castle and were able to sail unimpeded along the Aurajoki River into the town of Turku. During the battles of the 1520s, Swedish artillery managed to damage the southwest outer bailey and the cannon tower of Kuusisto Castle.

By the 1520s the medieval castles passed into the hands of King Gustavus Vasa as structures that were in poor condition in many respects. During the 16th century, some of the medieval castles were either torn down or left to decay (Kuusisto and Raasepori), while others underwent thorough repairs and restoration (Turku, Viipuri, Hämeenlinna, Kastelholm and Olavinlinna). As a result of these processes, the medieval outer baileys were covered by later structures or the debris of collapsing fill and earth.

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Abbreviations

ABOA = Turku Provincial Museum, Yearbook.
AMAF = Archaeologia Medii Aevi Finlandiae
FM = Finsk Museum
HAIK = Historiallinen Aikakauskirja
HTF = Historisk Tidskrift för Finland
KLNM = Kulturhistorisk Lexikon för Nordisk Medeltid
MVRO = Department of Monuments and Sites of the National Board of Antiquities
NBA = National Board of Antiquities
SHS = Suomen Historiallinen Seura
SKS = Suomen Kirjallisuuden Seura
SM = Suomen Museo
SMYA = Suomen Muinaismuistoyhdistyksen Aikakauskirja
THARK = Turun Historiallinen Arkisto
TKHM = Historical Museum of the City of Turku
TMM = Turku Provincial Museum.

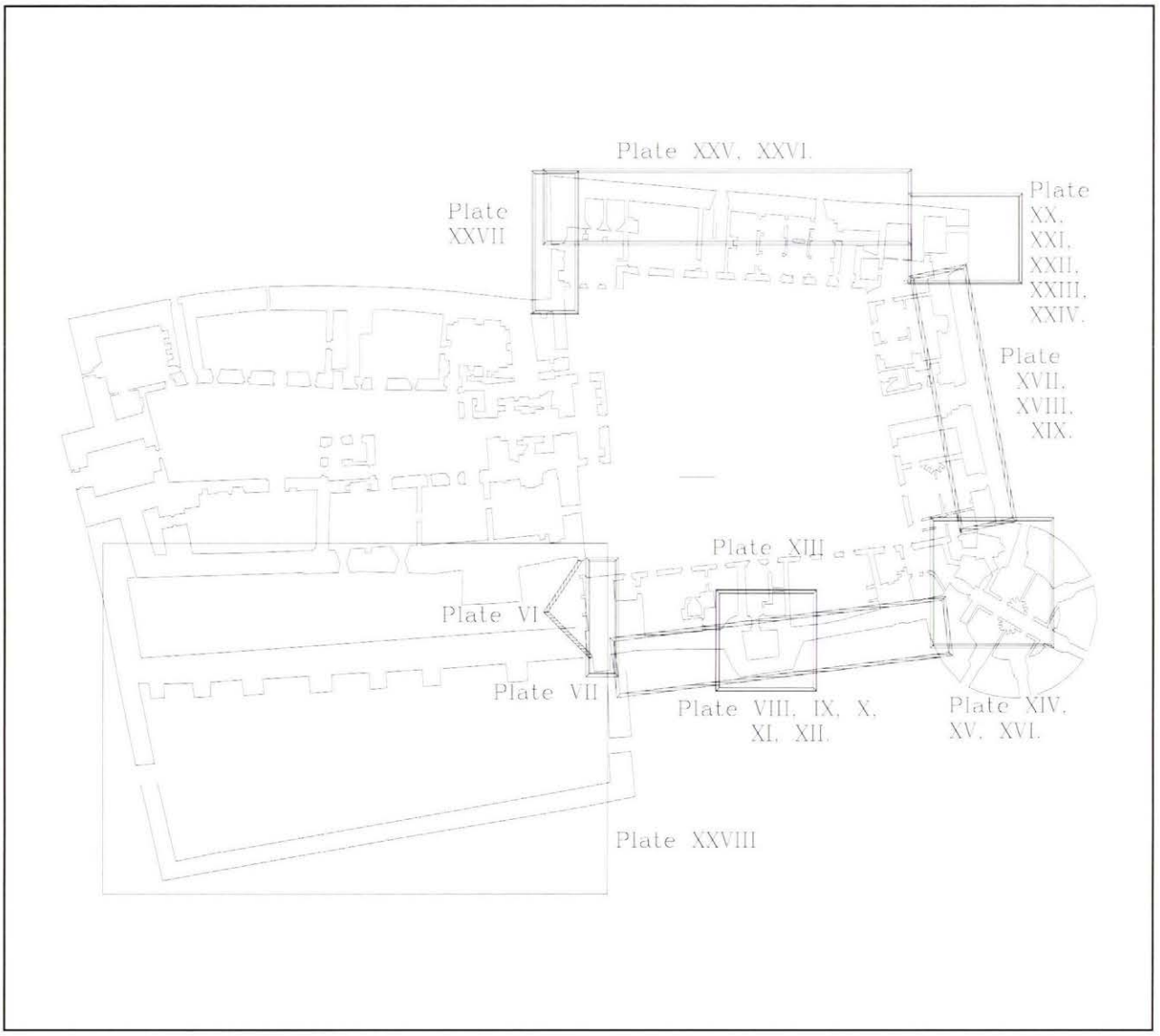
Plate XXV, XXVI.
Plate XXVII
Plate XX, XXI, XXII, XXIII, XXIV.
Plate XVII, XVIII, XIX.
Plate XIII
Plate VI
Plate VII
Plate VIII, IX, X, XI, XII.
Plate XIV, XV, XVI.
Plate XXVIII

APPENDIX 1

Maps and plans of Turku Castle

(The maps and plans are mostly in 1:50 scale, originally in A1-A2 format. The maps have been reduced in size for the present study to A4 format (not to precise scale)
NBA = Department of Monuments and Sites of the National Board of Antiquities

Plate I	Turku Castle and environs (NBA archives).
Plate II	East outer bailey of Turku Castle, First storey (NBA archives).
Plate III	East outer bailey of Turku Castle, Second storey (NBA archives).
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Plate V	East outer bailey of Turku Castle, Fourth storey (NBA archives).
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Plate VIII	East outer bailey of Turku Castle. South wing. South wall. Plan of older wall structure. (NBA archives: 853.21.1319).
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Plate X	East outer bailey of Turku Castle. South wing south wall. Elevation of older wall structure (NBA archives: 853.21.1324).
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Plate XVI	East outer bailey of Turku Castle. East wing. The round tower. Wall structures revealed in repairs in 1961-62 (NBA archives: Turku Castle).
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Plate XIX	East outer bailey of Turku Castle. East wing. East wall. Log framework foundation of the east wall. Sections (NBA archives: 853.21.1296).
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Plate XXIII	East outer bailey of Turku Castle. East wing. Northeast tower. Lower parts of the outside tower wall. Elevations (NBA archives: 853.21.1288).
Plate XXIV	East outer bailey of Turku Castle. East wing. Northeast tower. Outside tower walls. Elevation (NBA archives: 853.21.1046).
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Plate XXIX	South wards of Turku Castle. Plan (NBA archives: 853.21.0953).

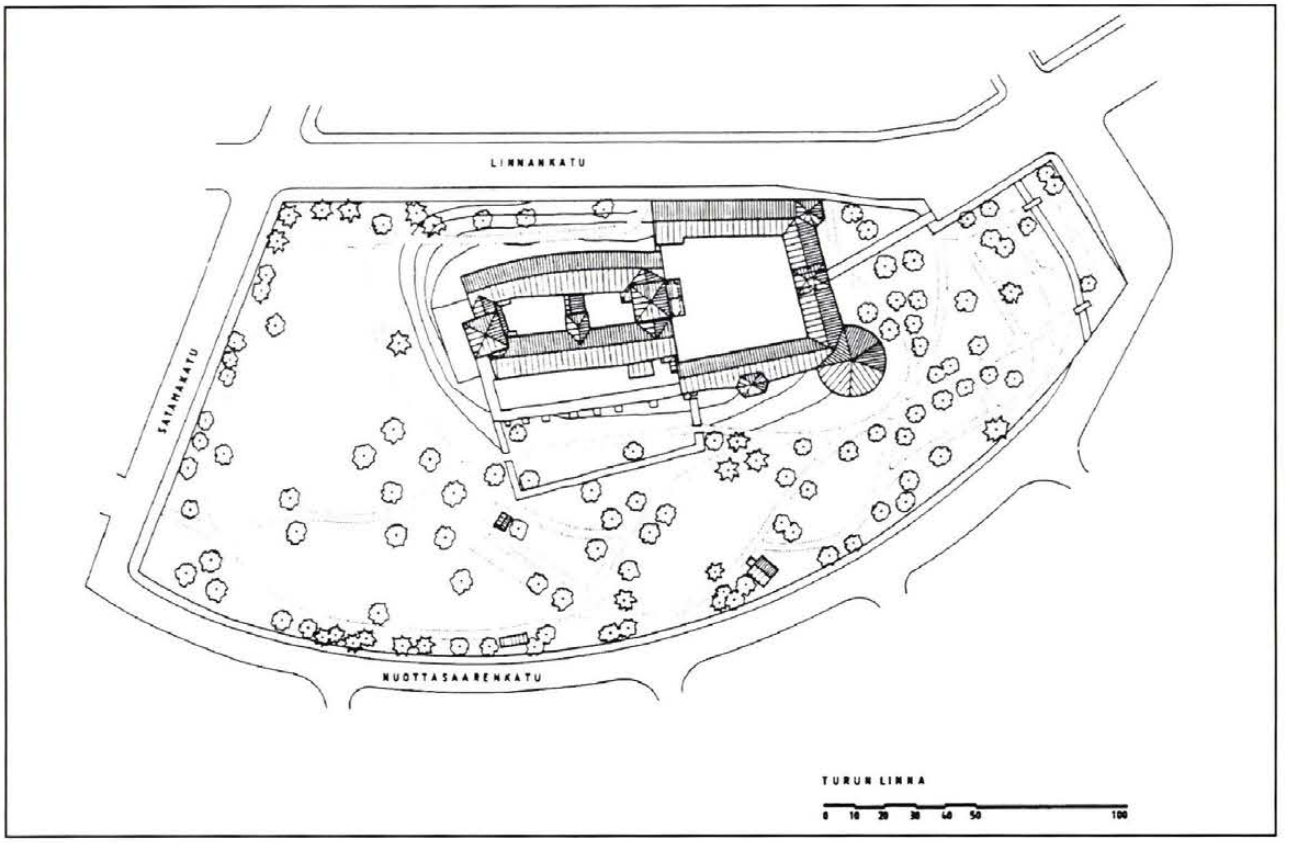
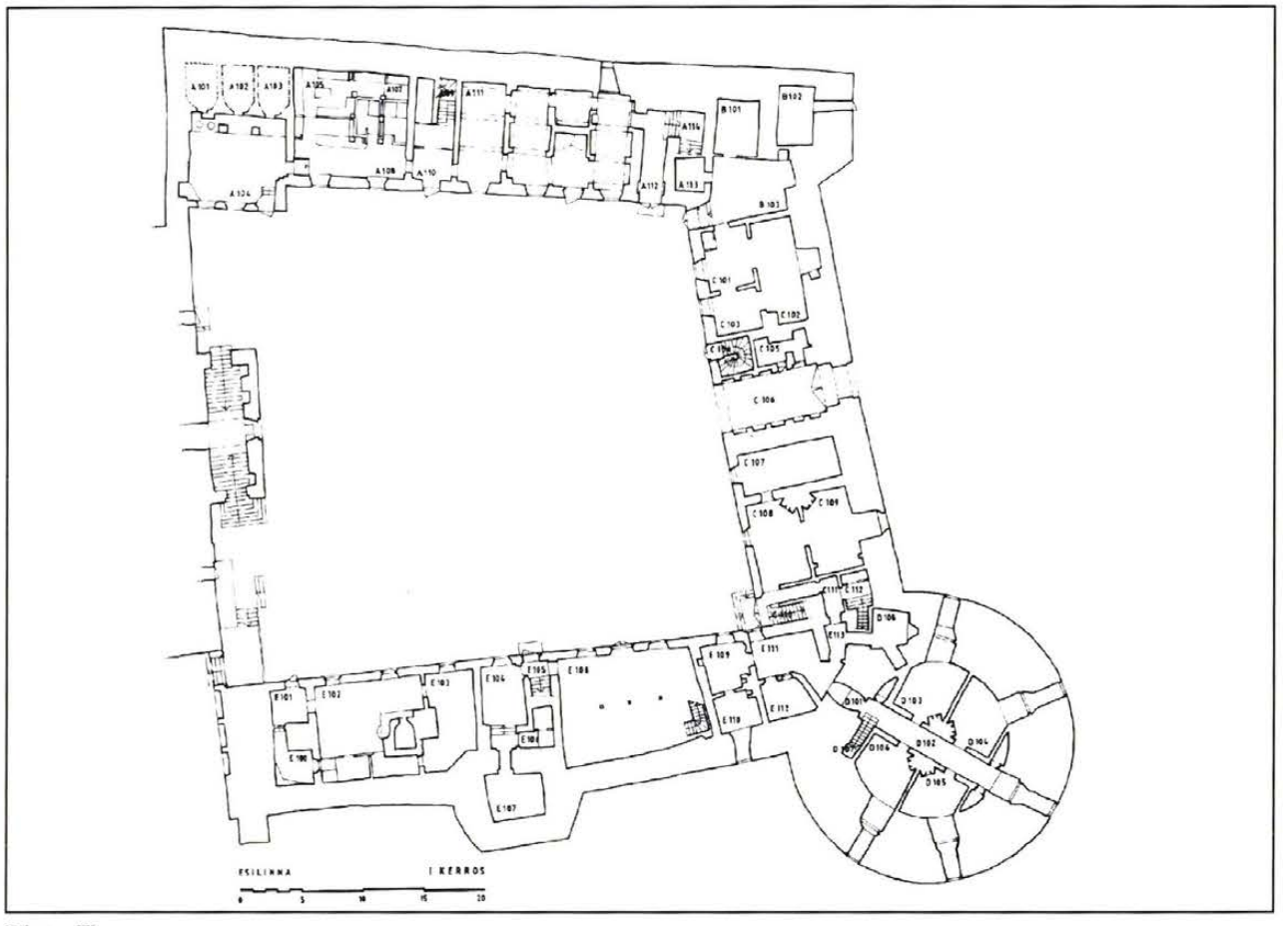


Plate I.



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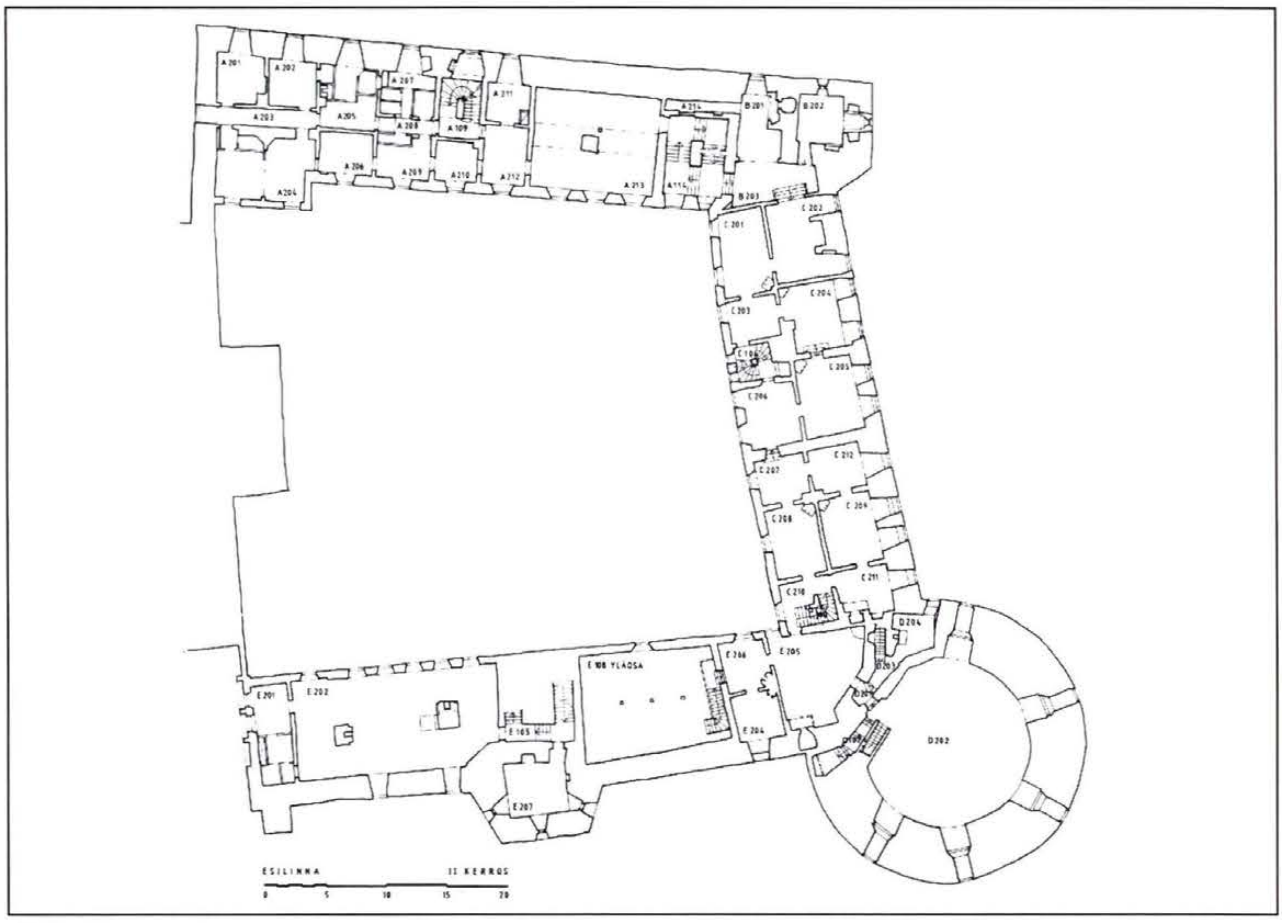

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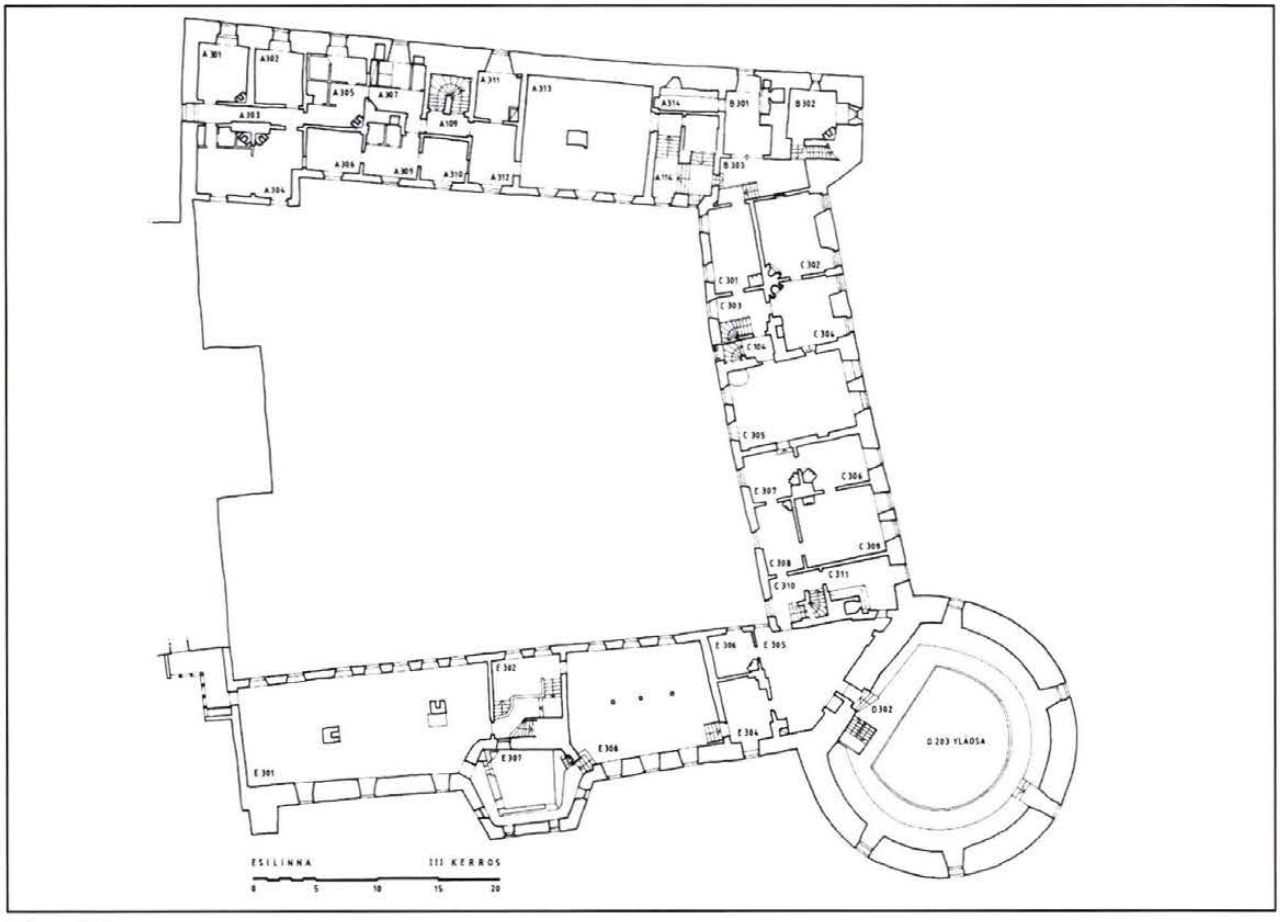

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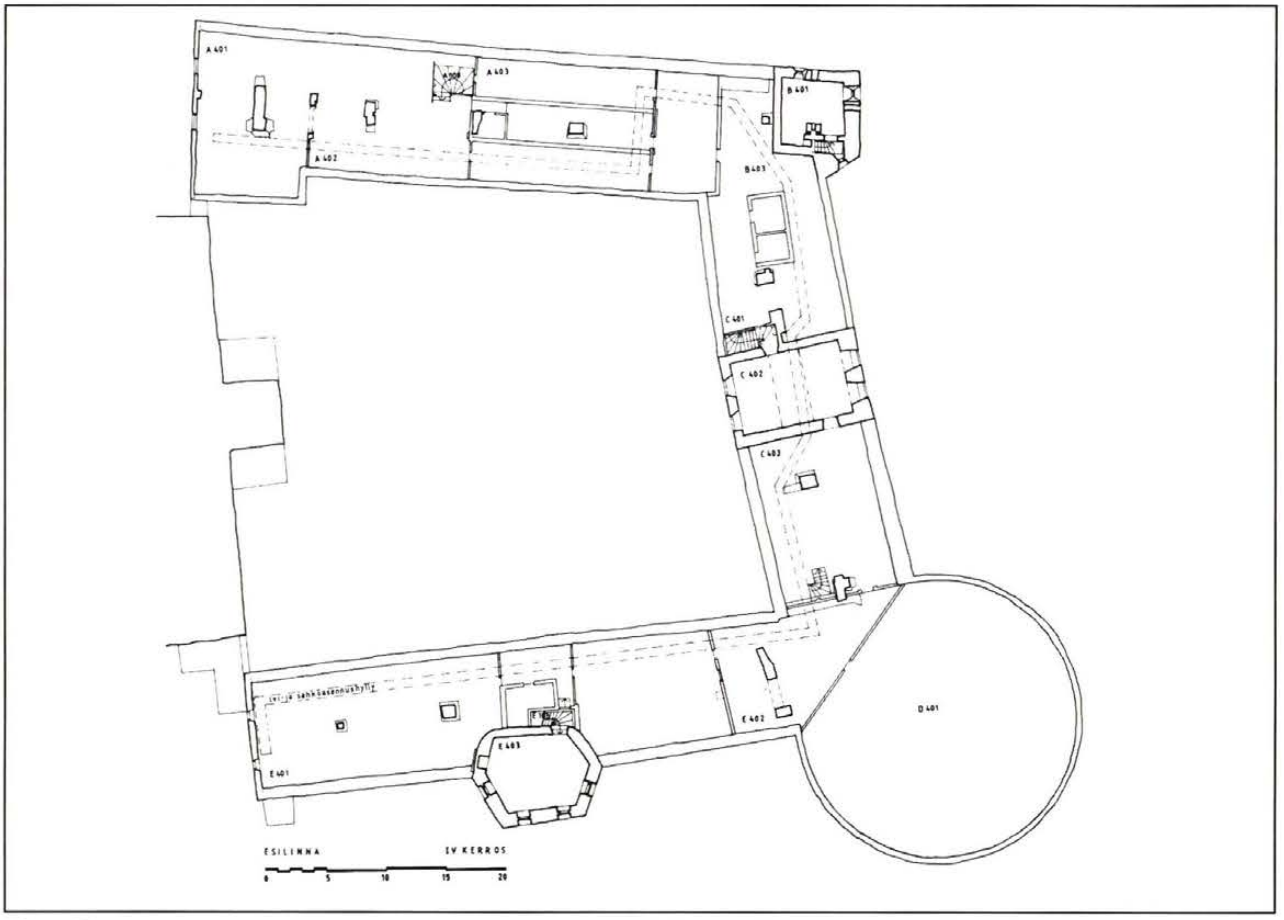

Plate V.

Plate VI.

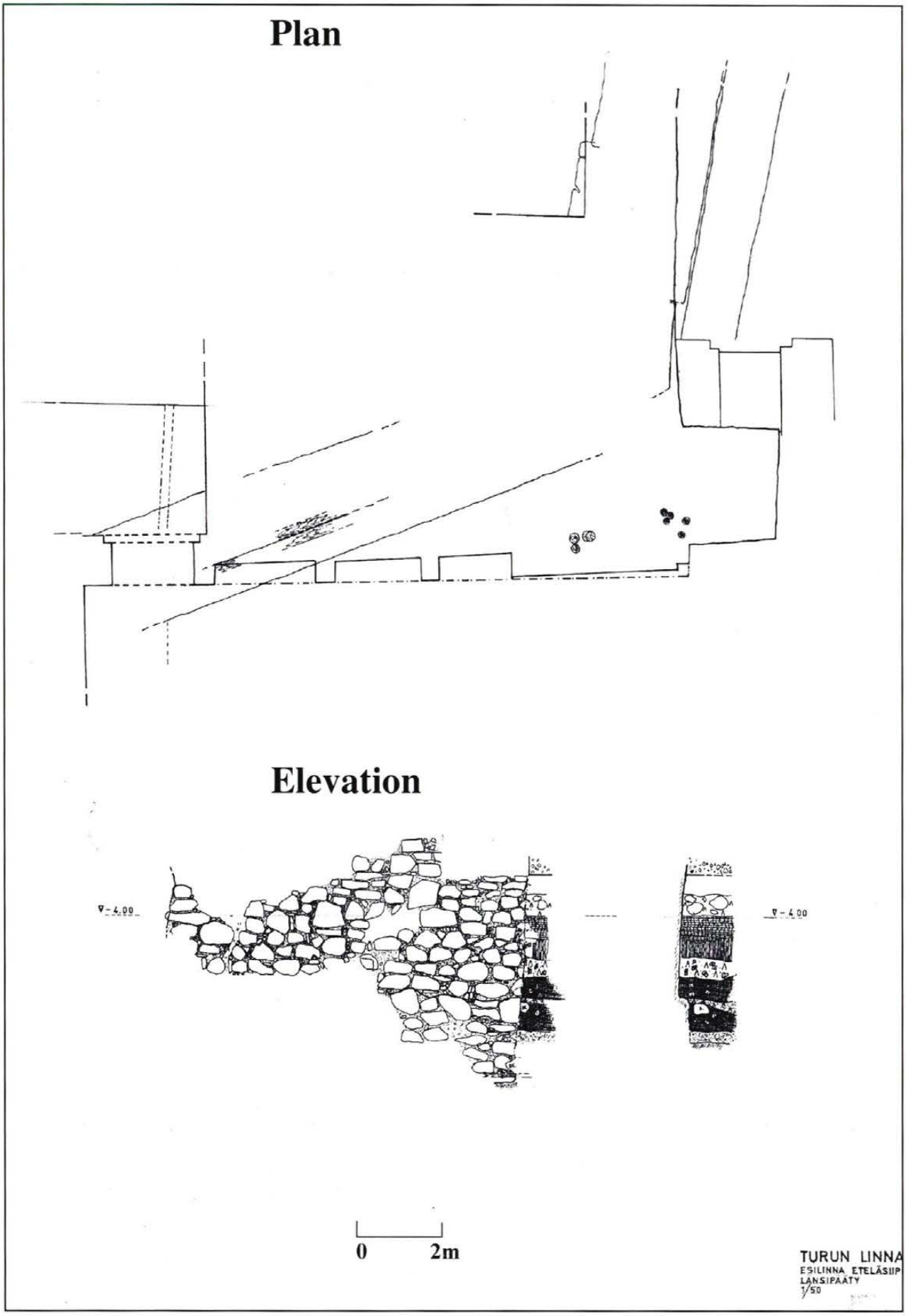
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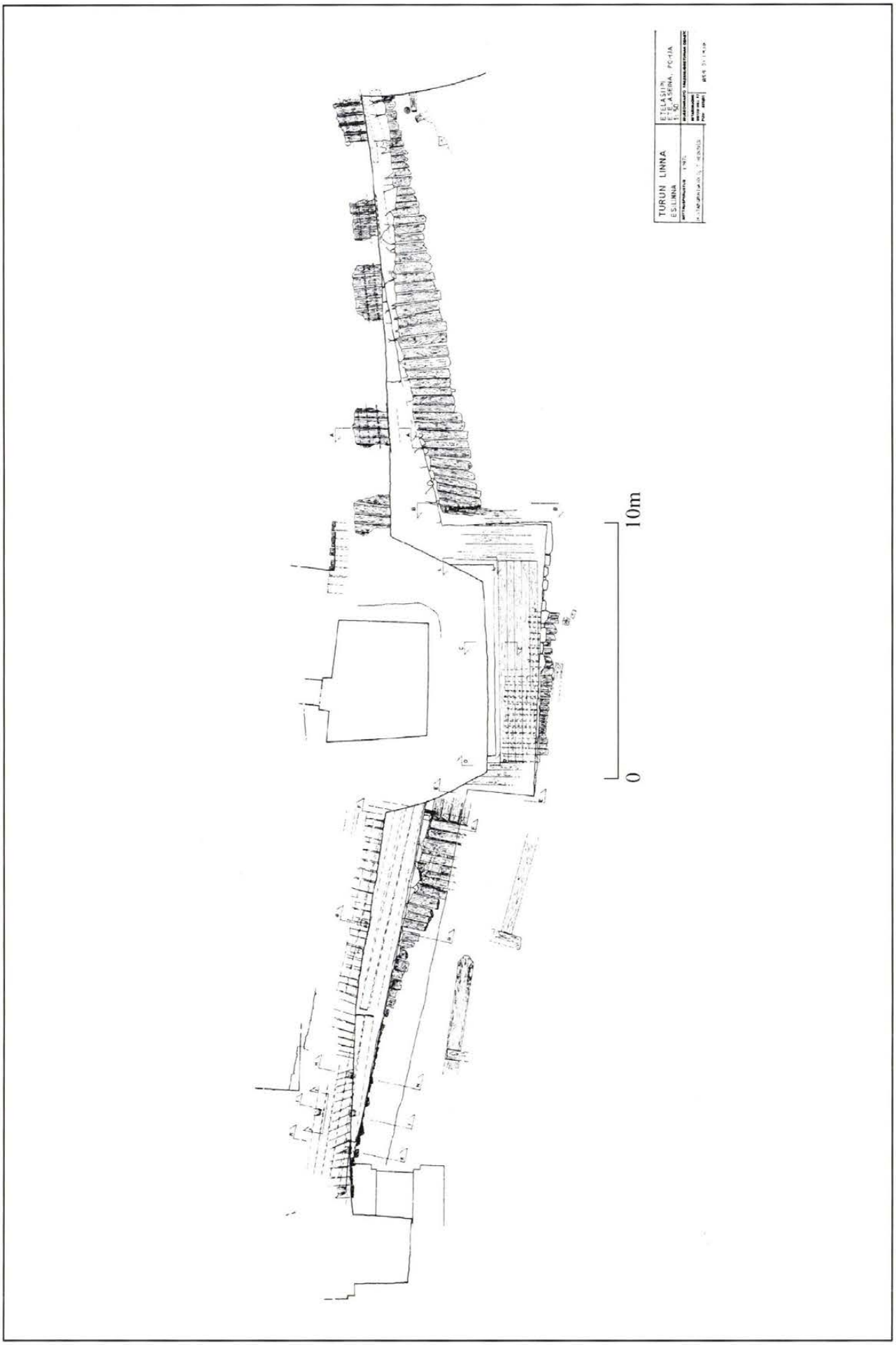
Plate VII.



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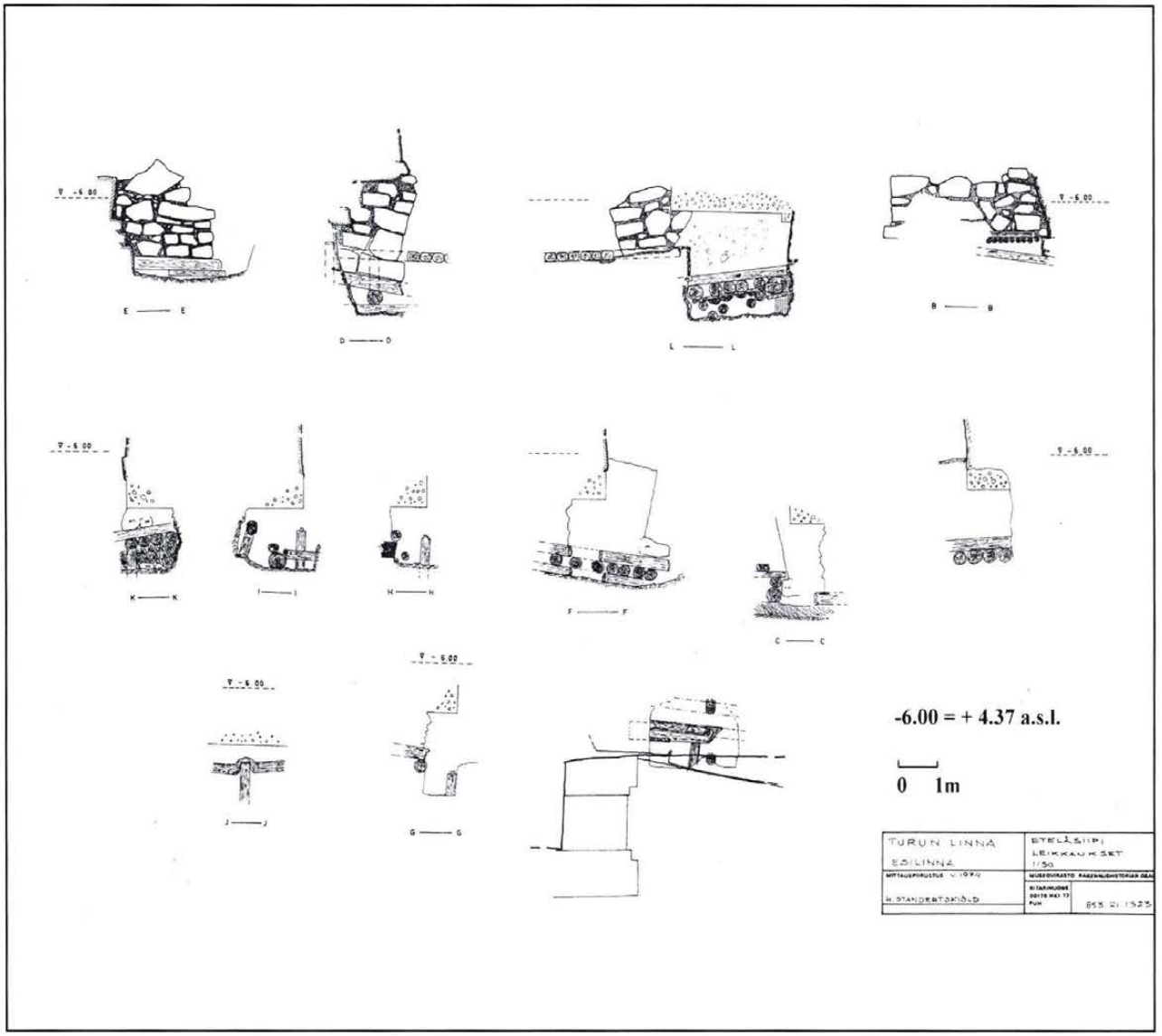
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K — K
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F — F
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J — J
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RITELÄSIPI
LEIKKAUKSET
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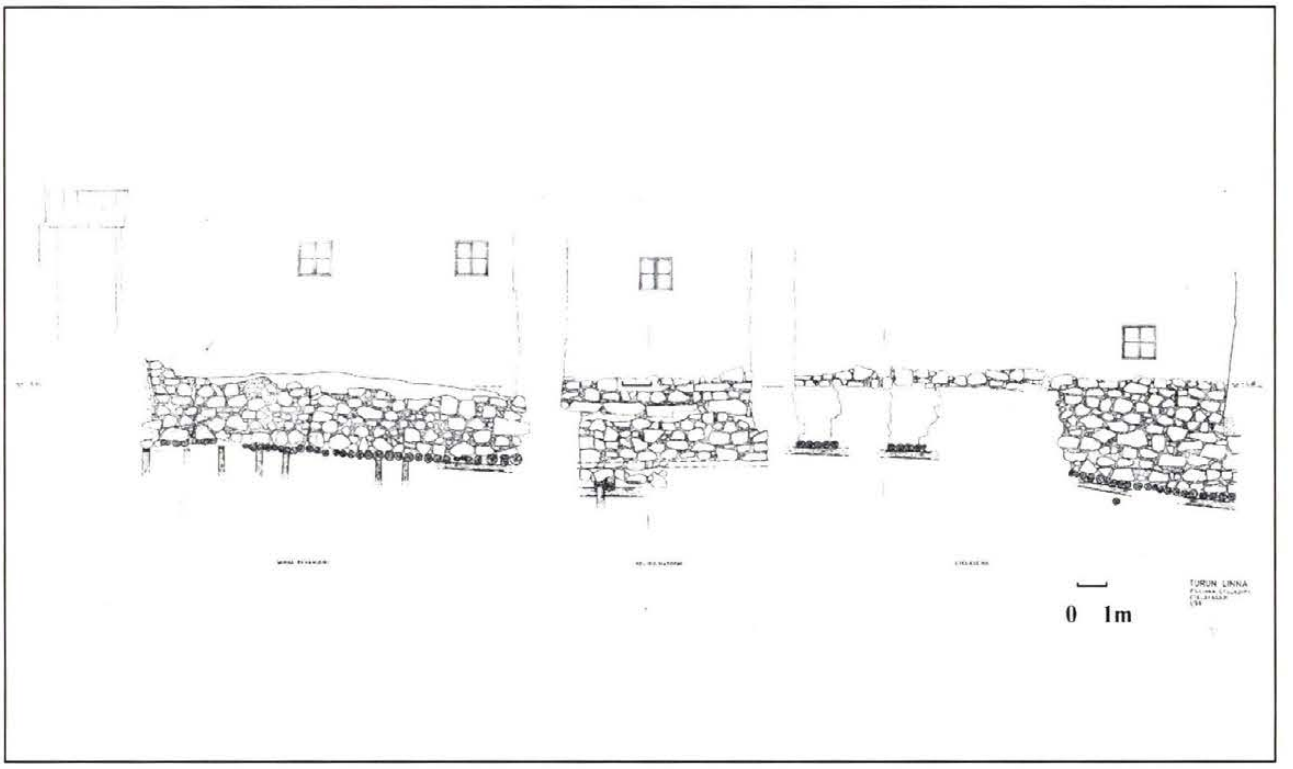
Plate IX.



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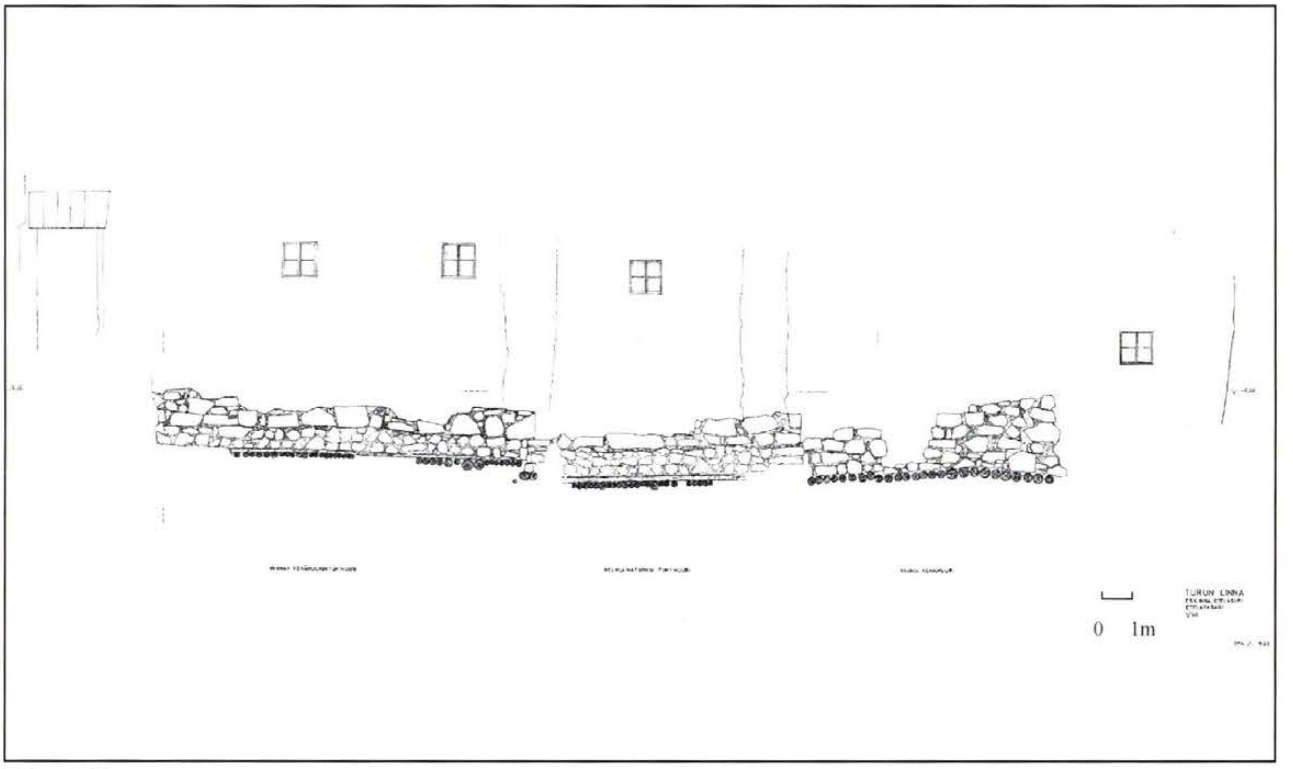
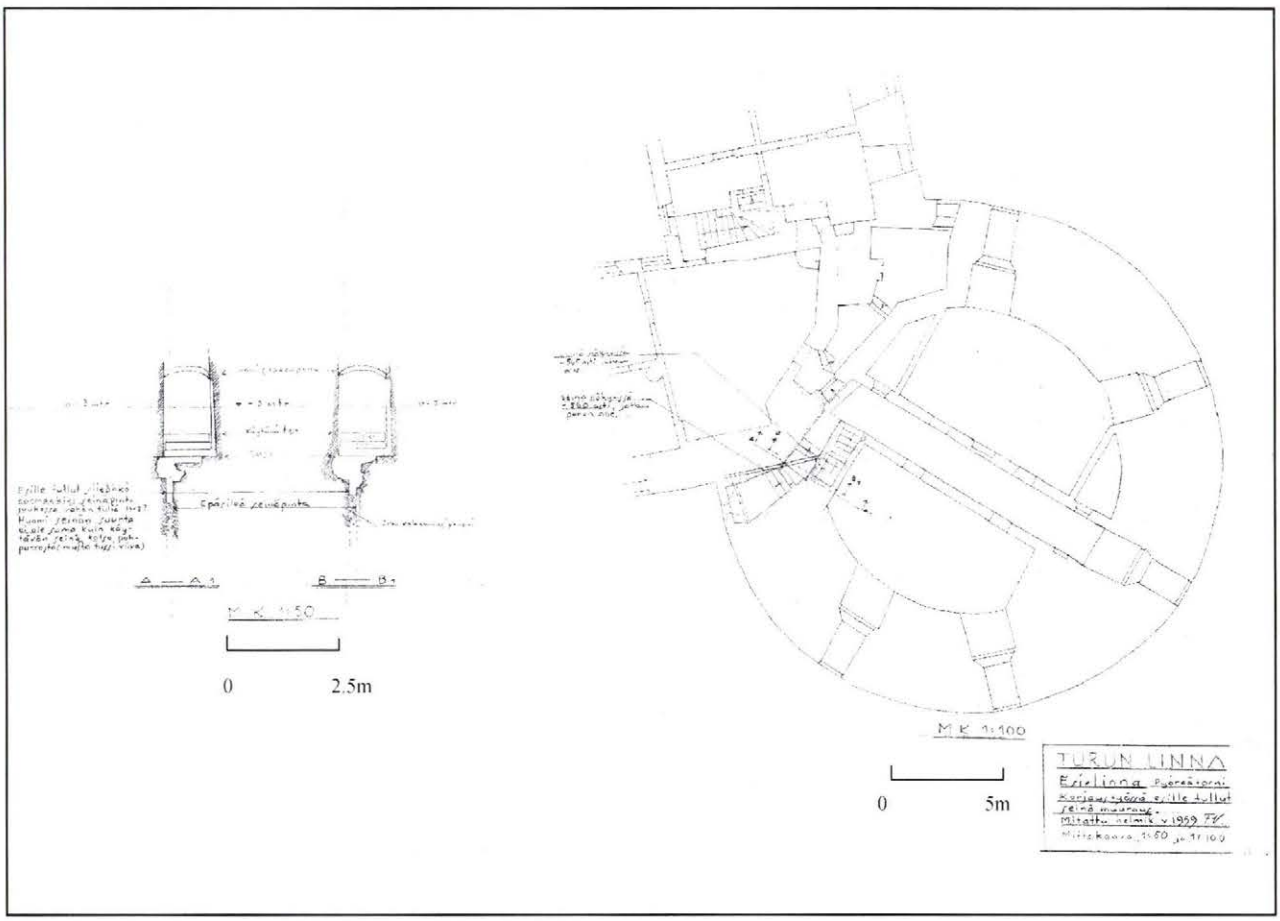


Plate XI.

Plate XII.

Plate XIII.



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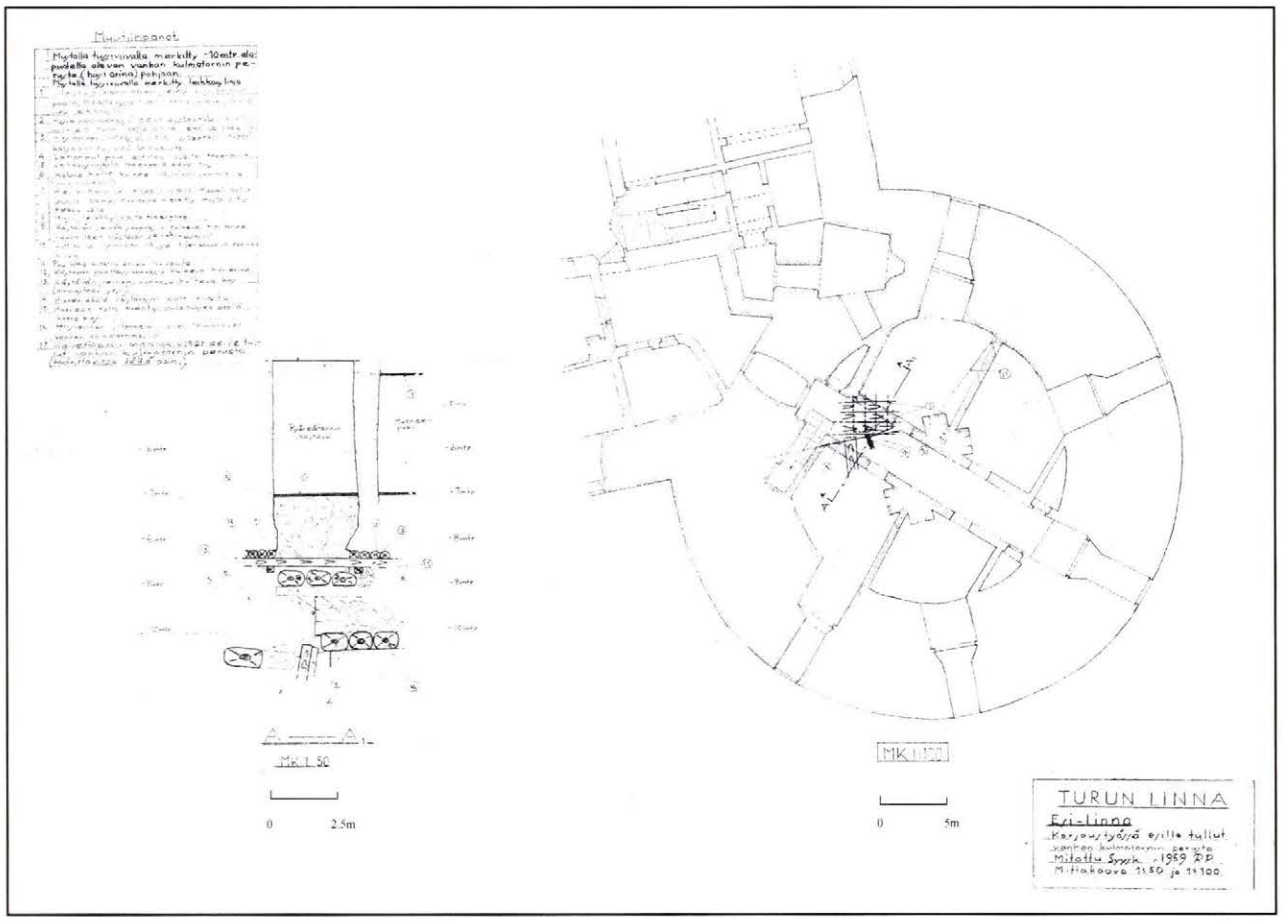
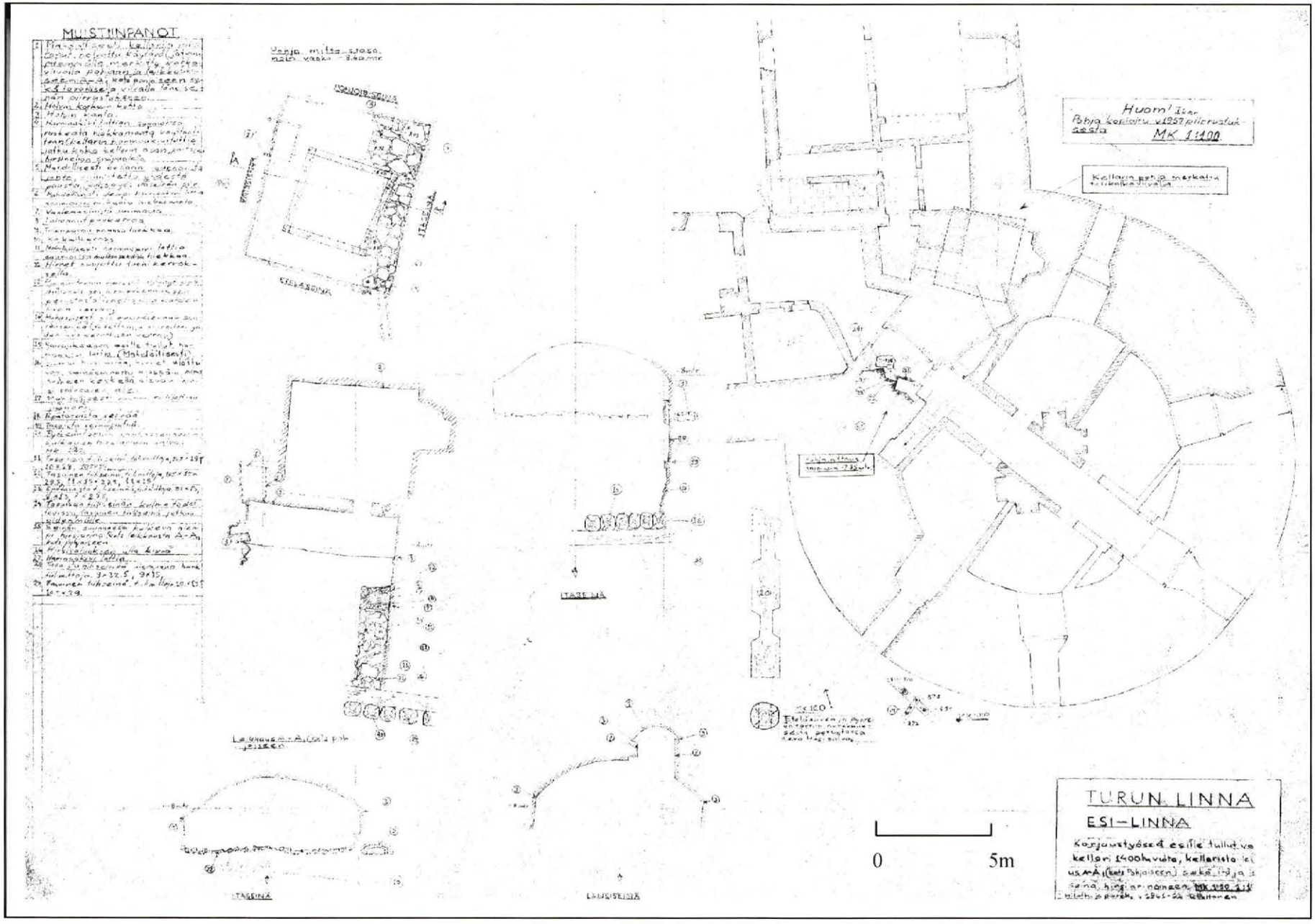
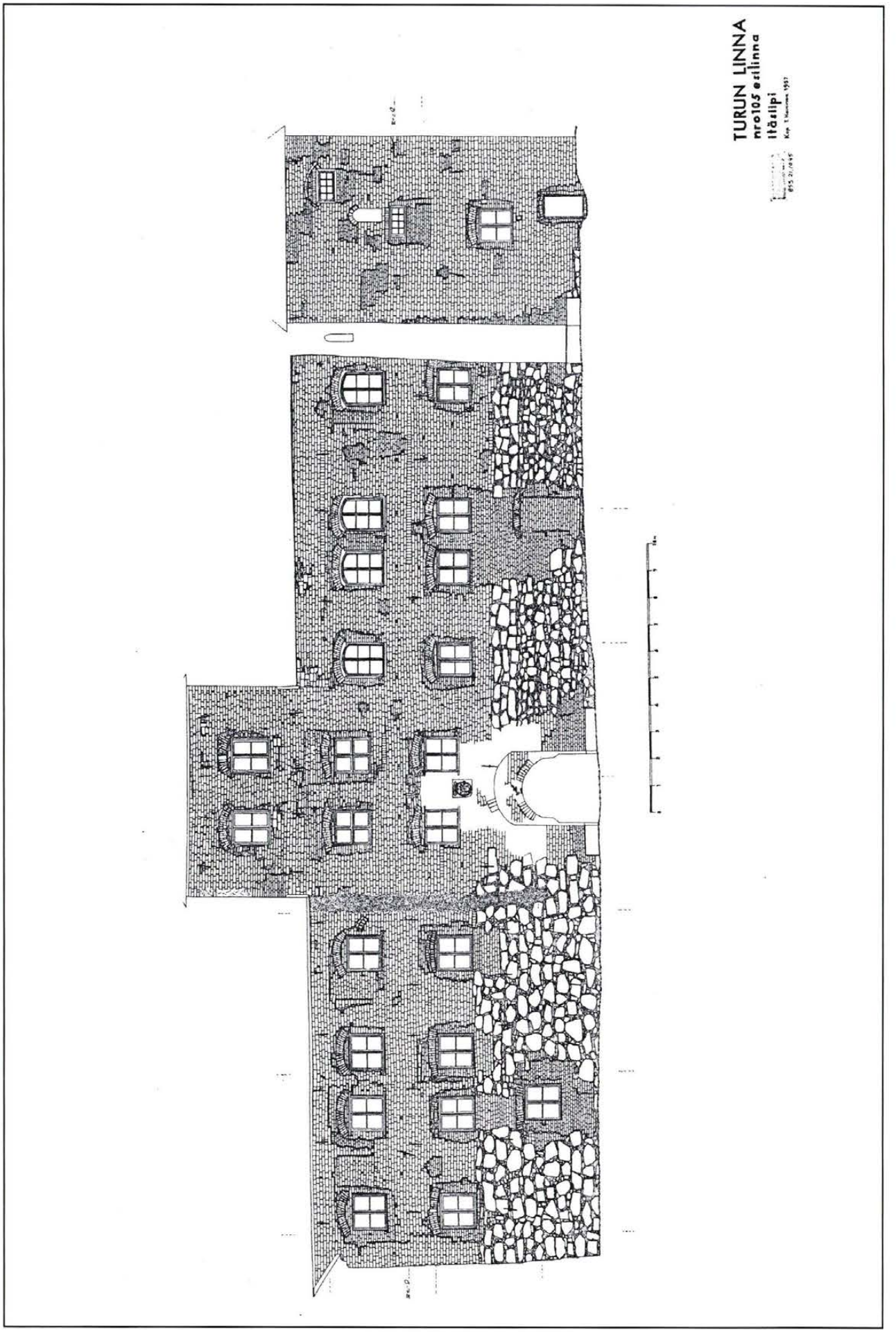


Plate XV.

Plate XVI.





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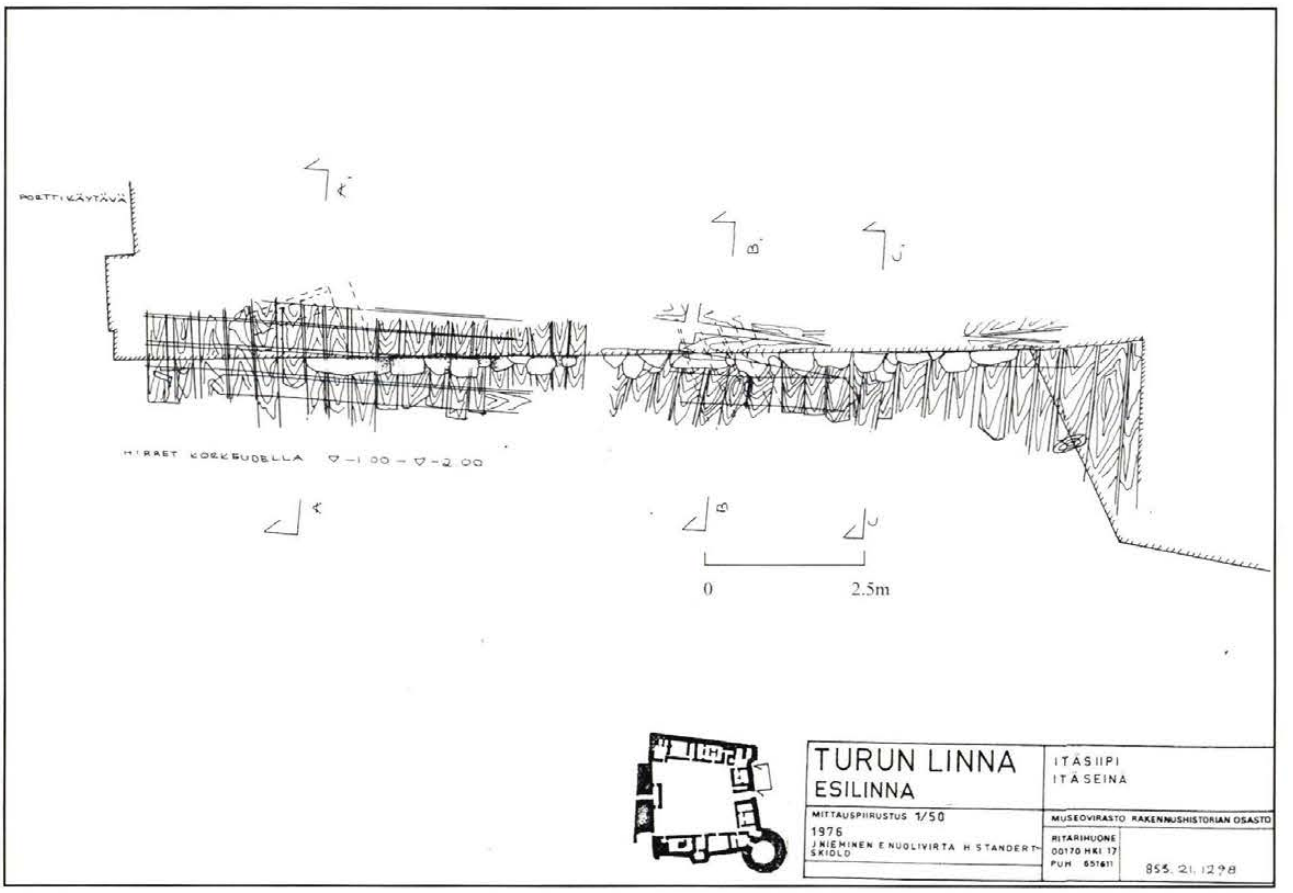

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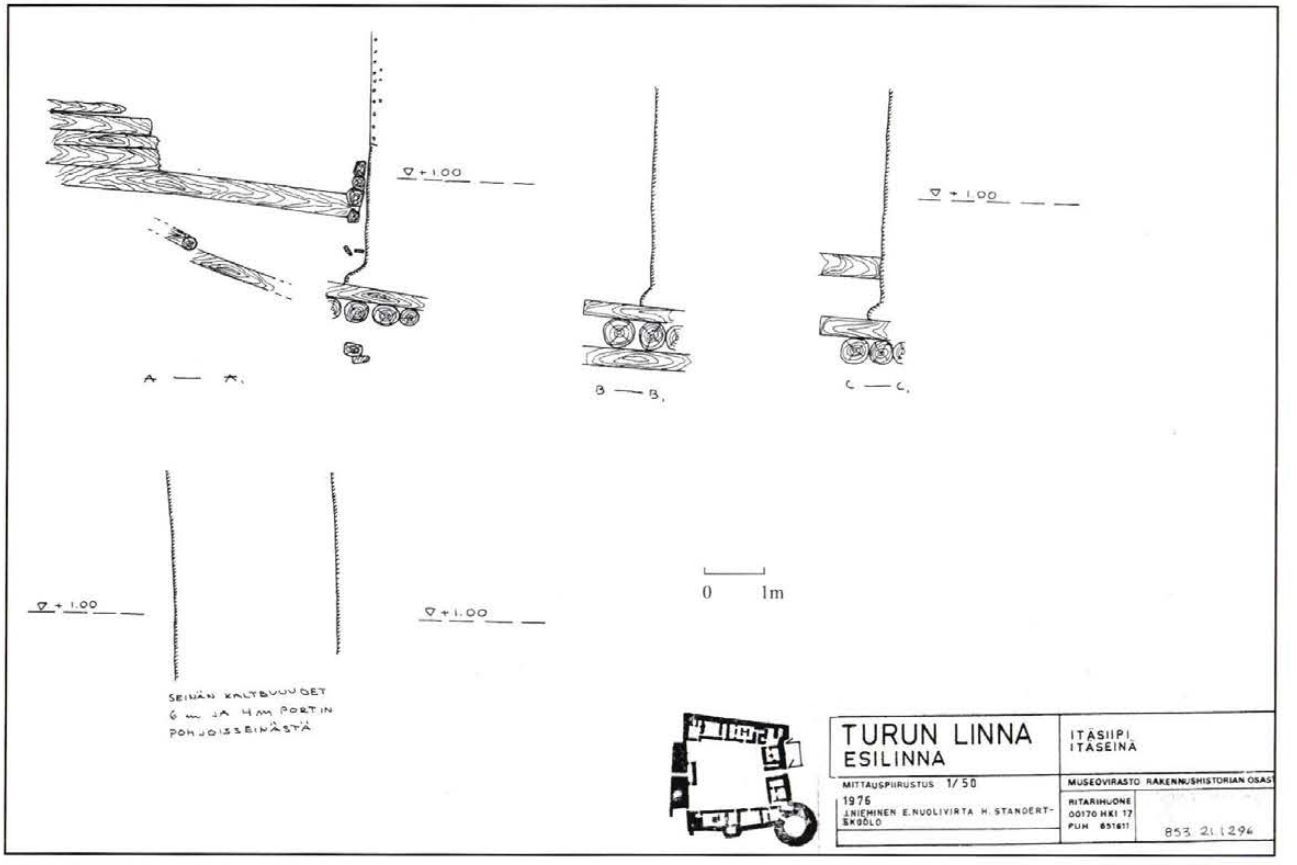

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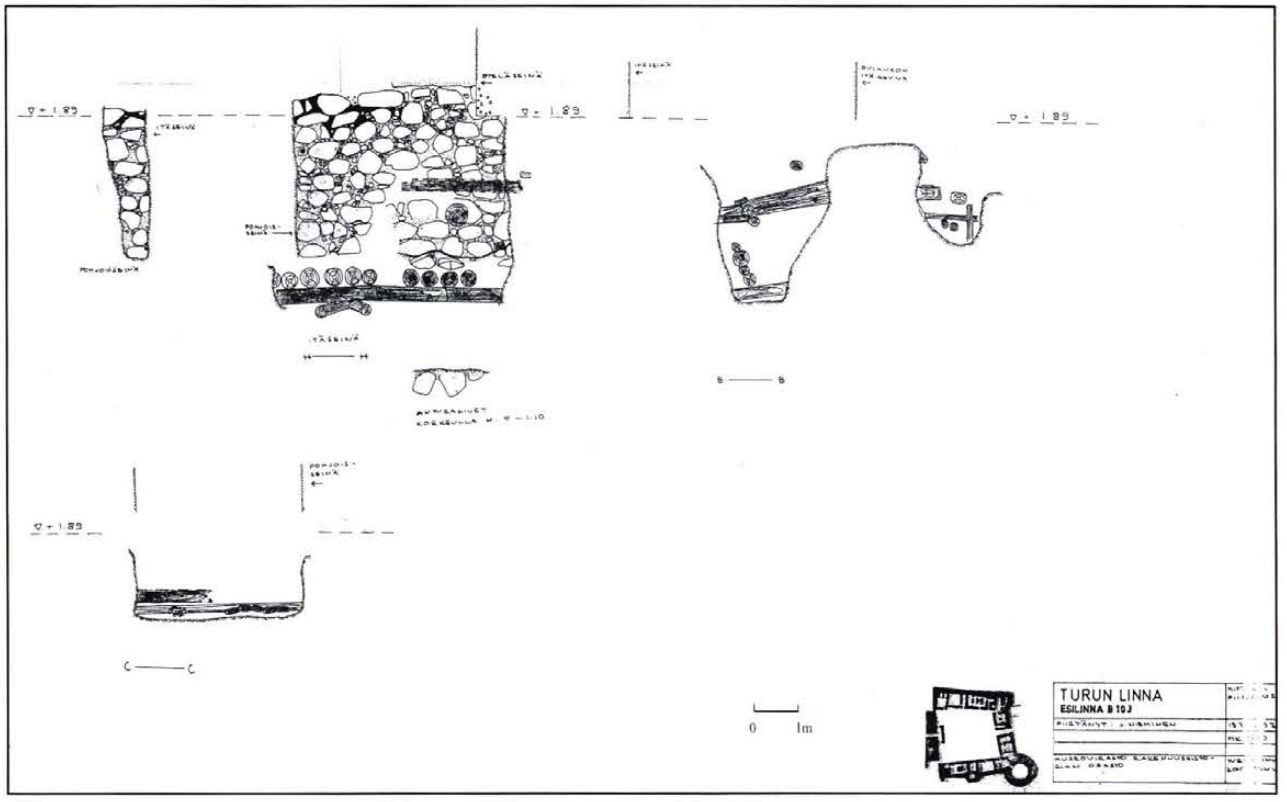

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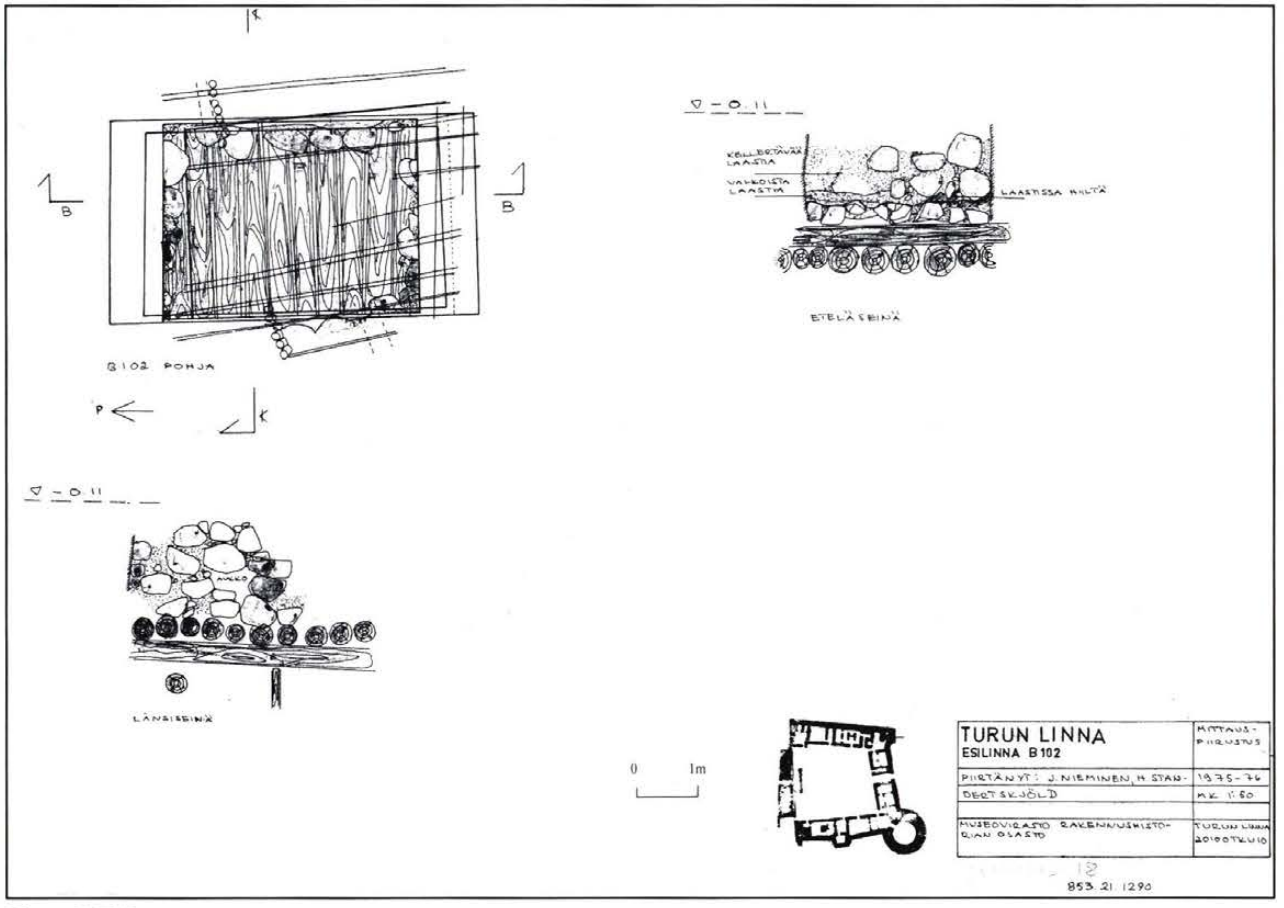

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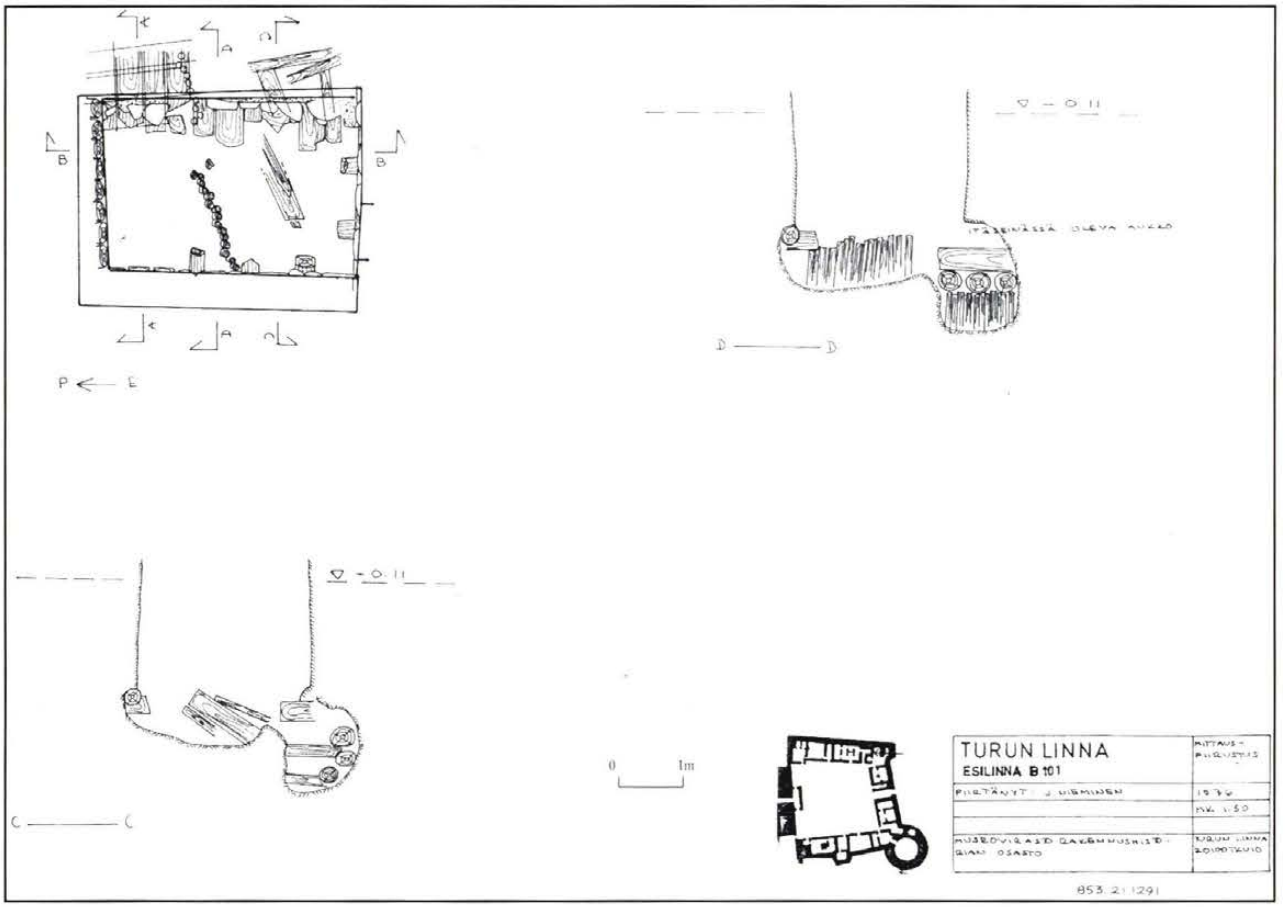

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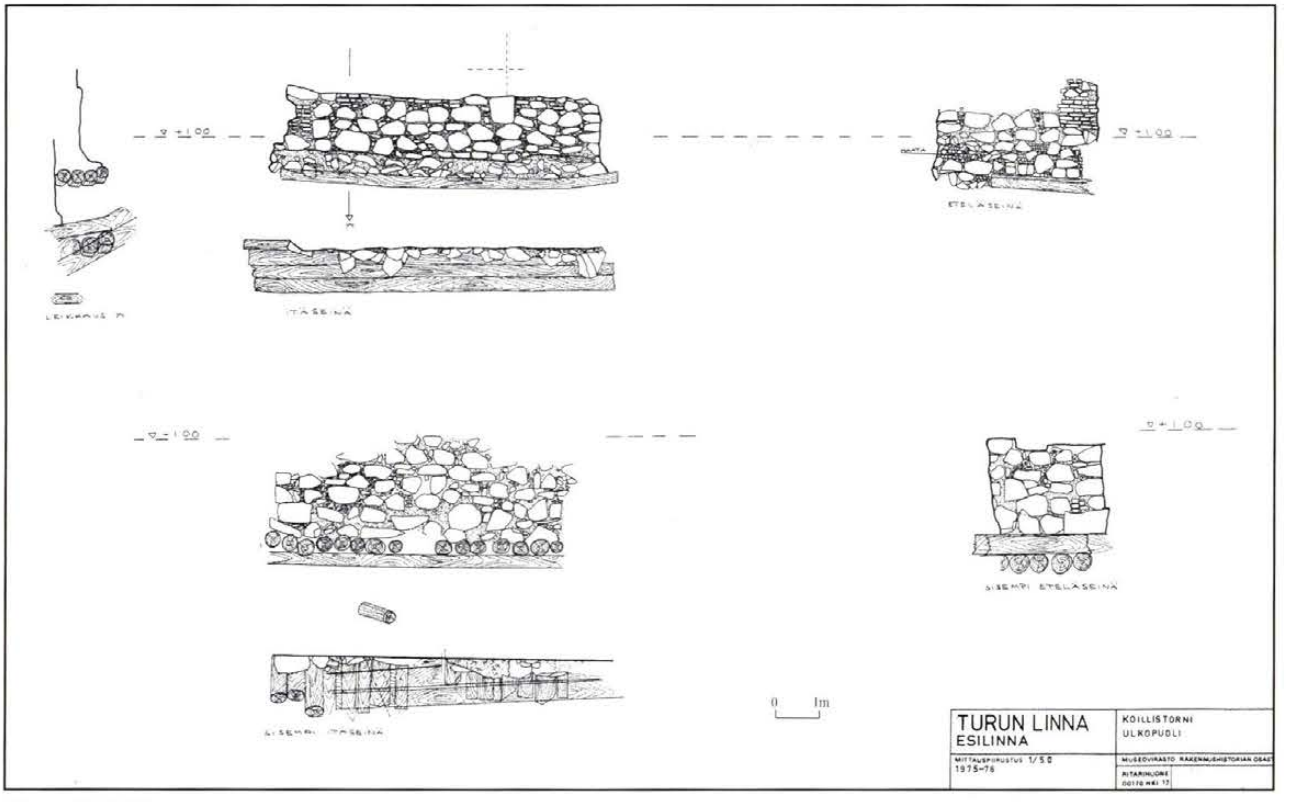

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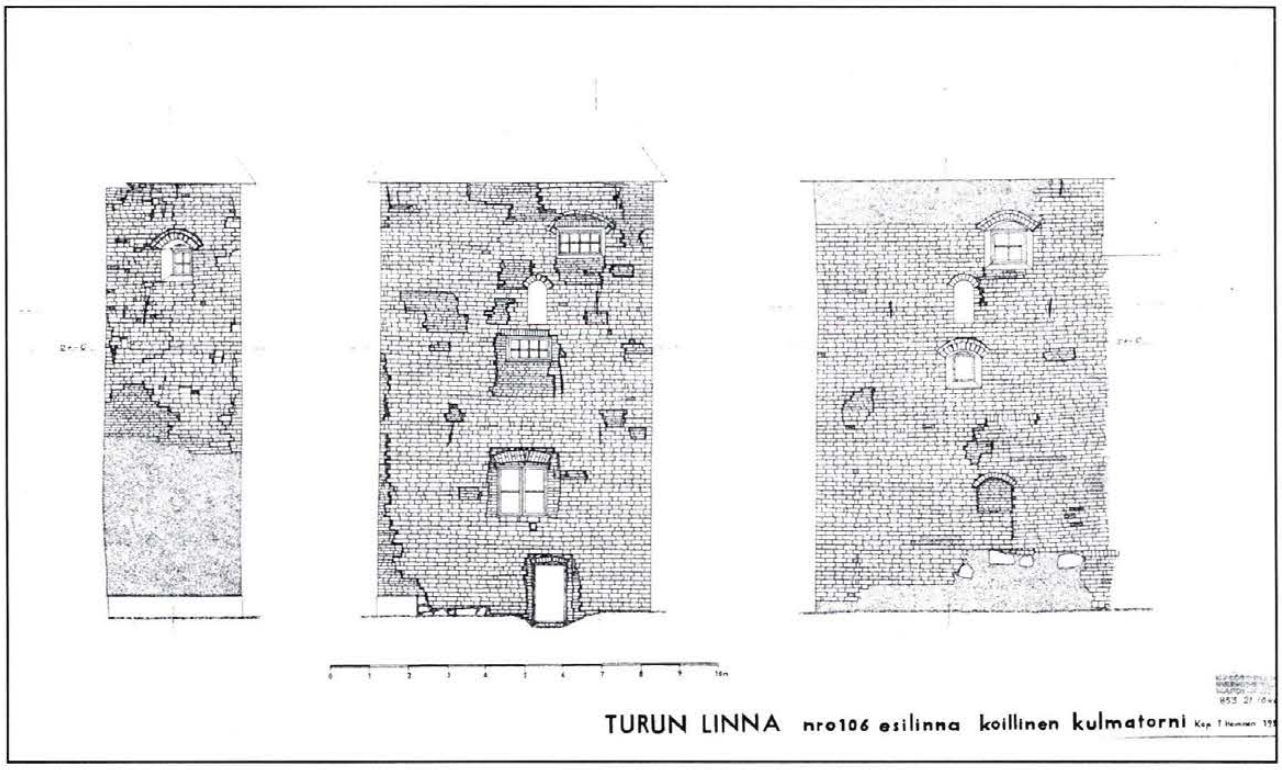

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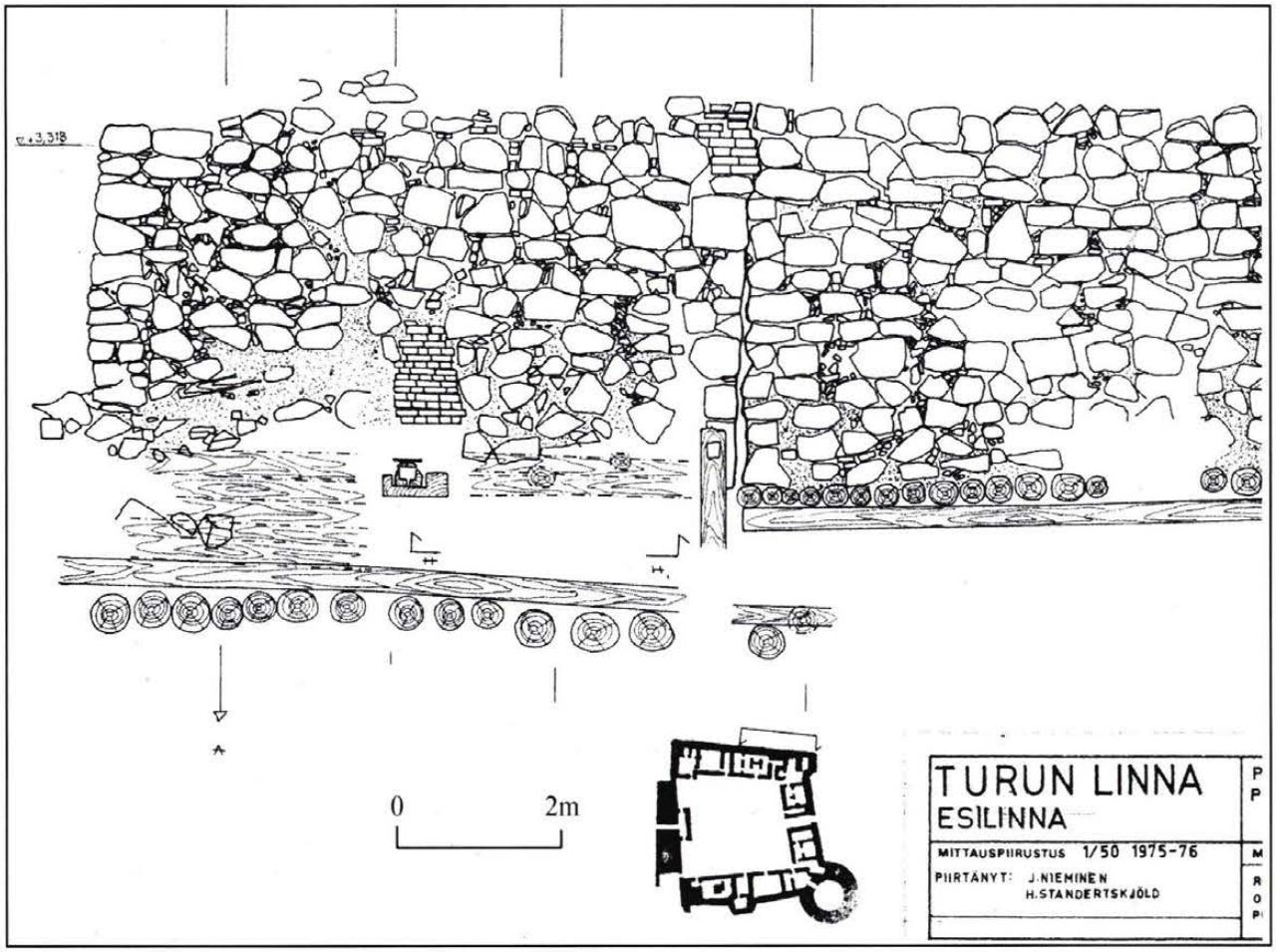

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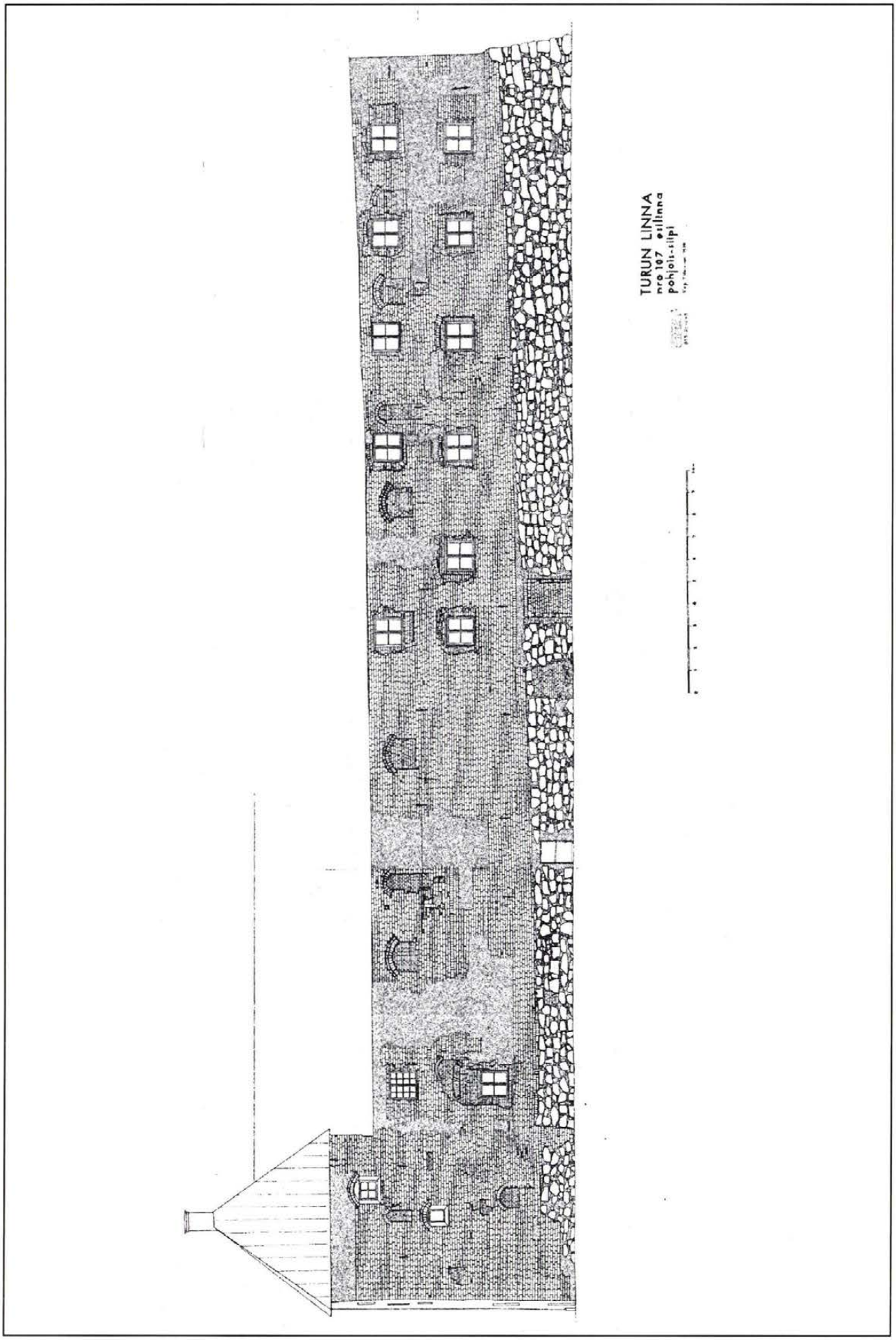

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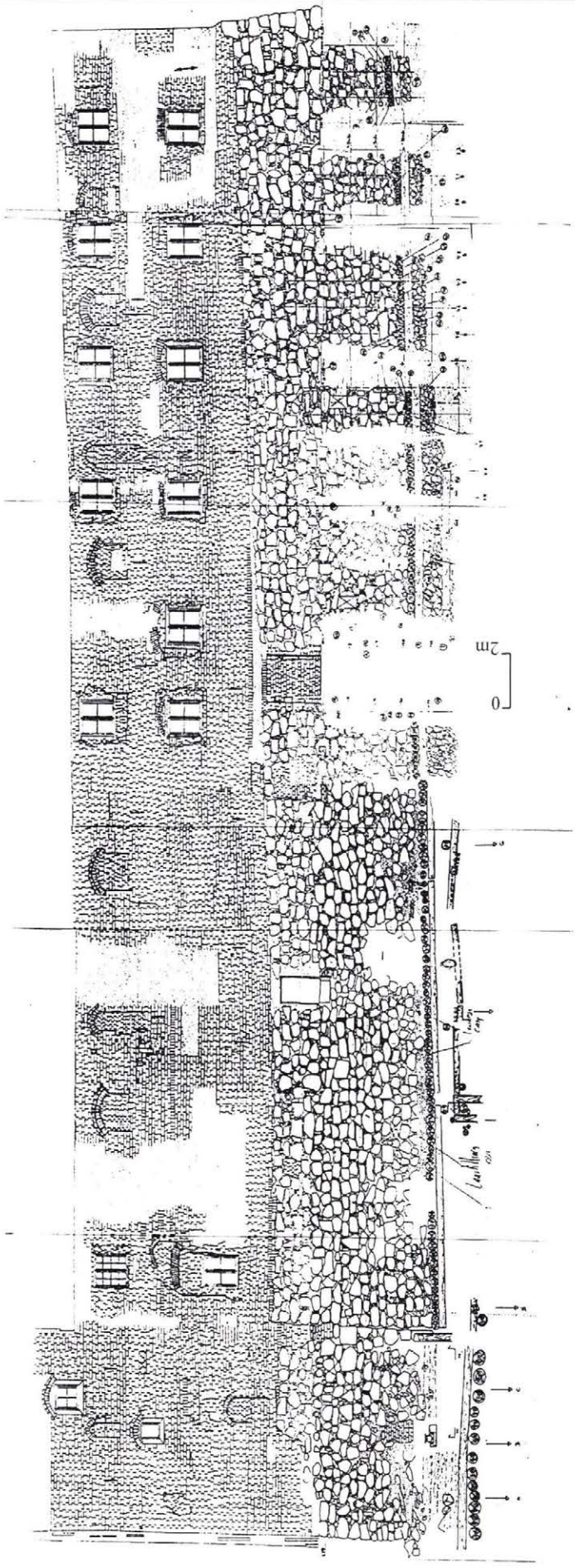

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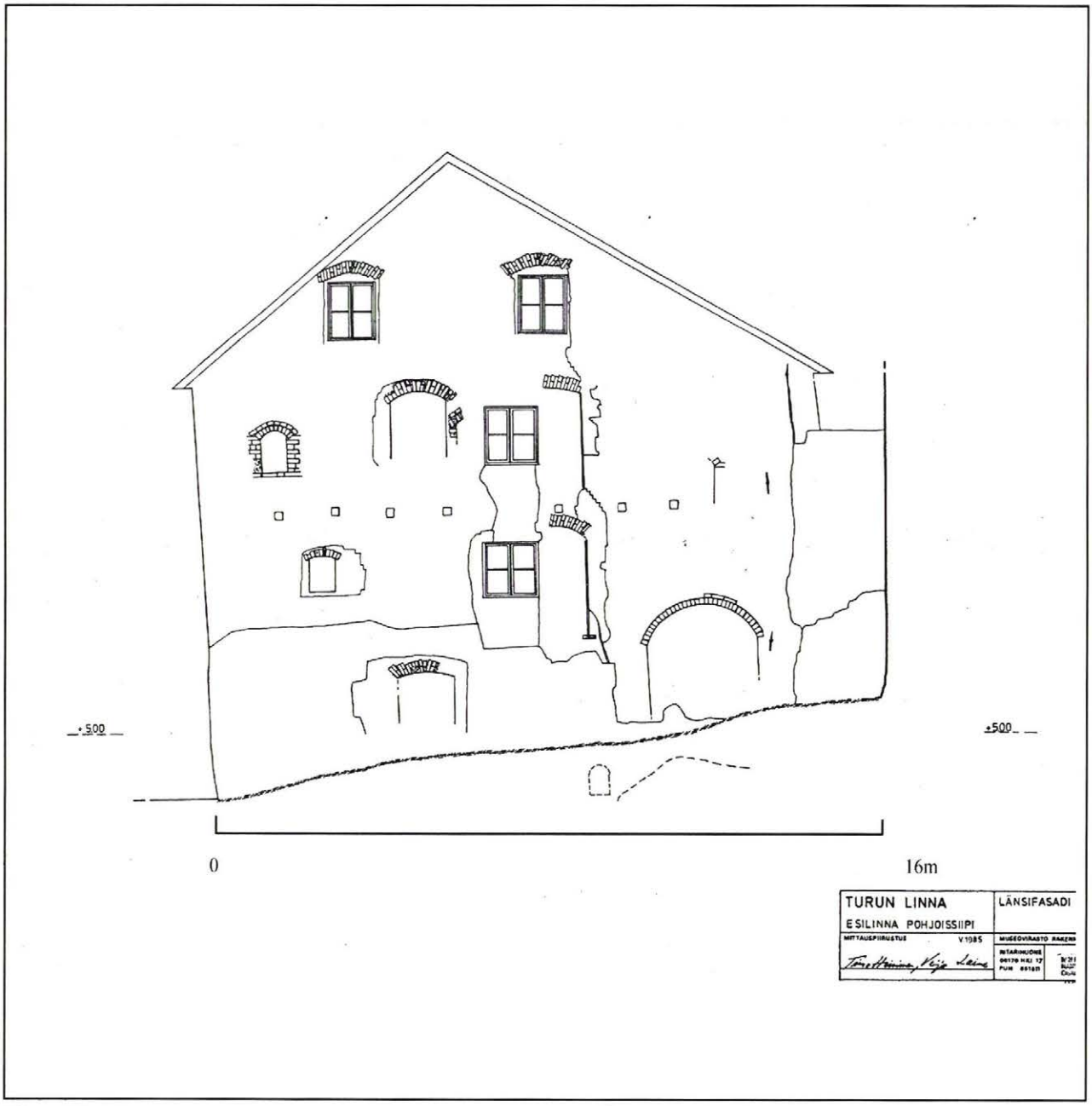

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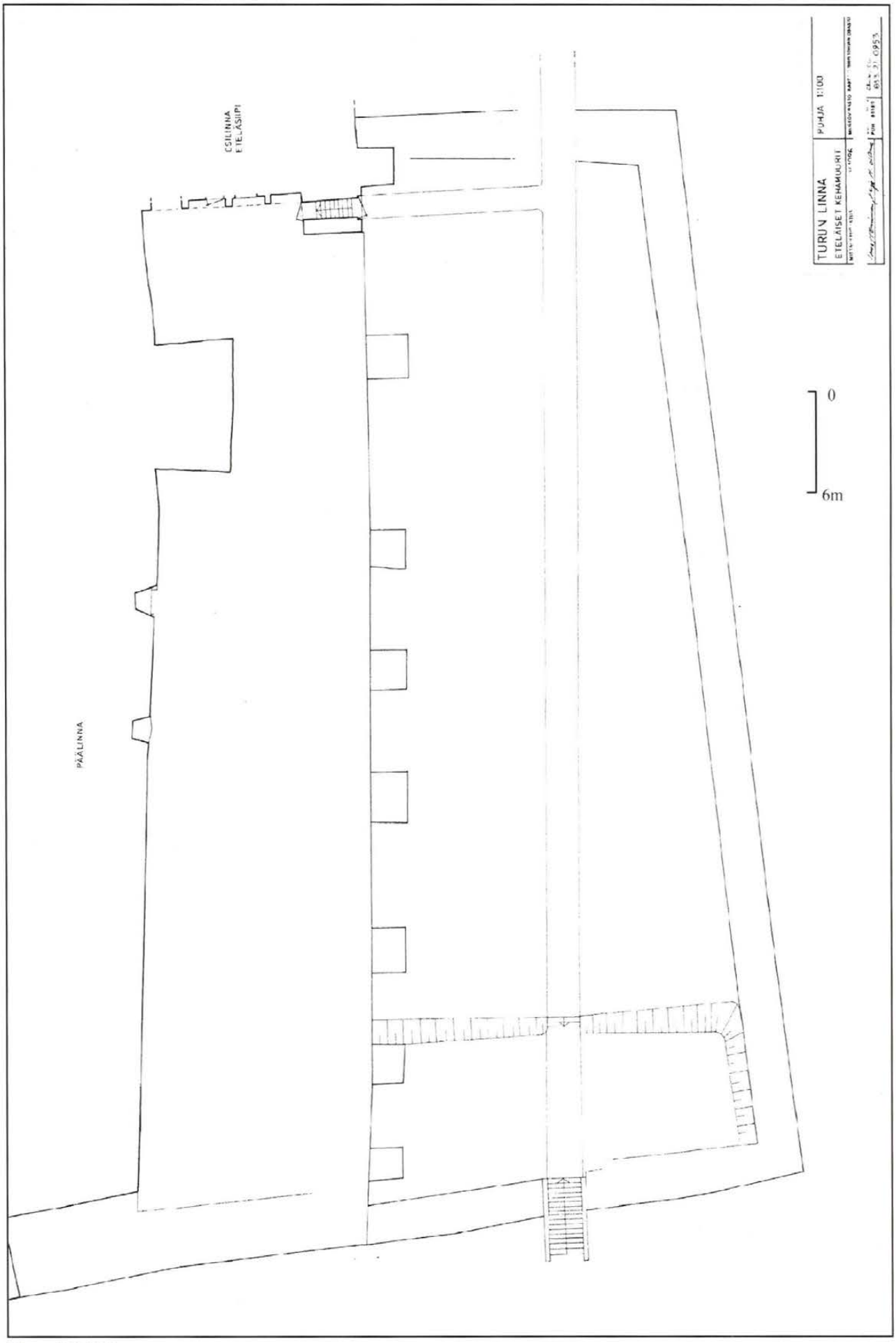
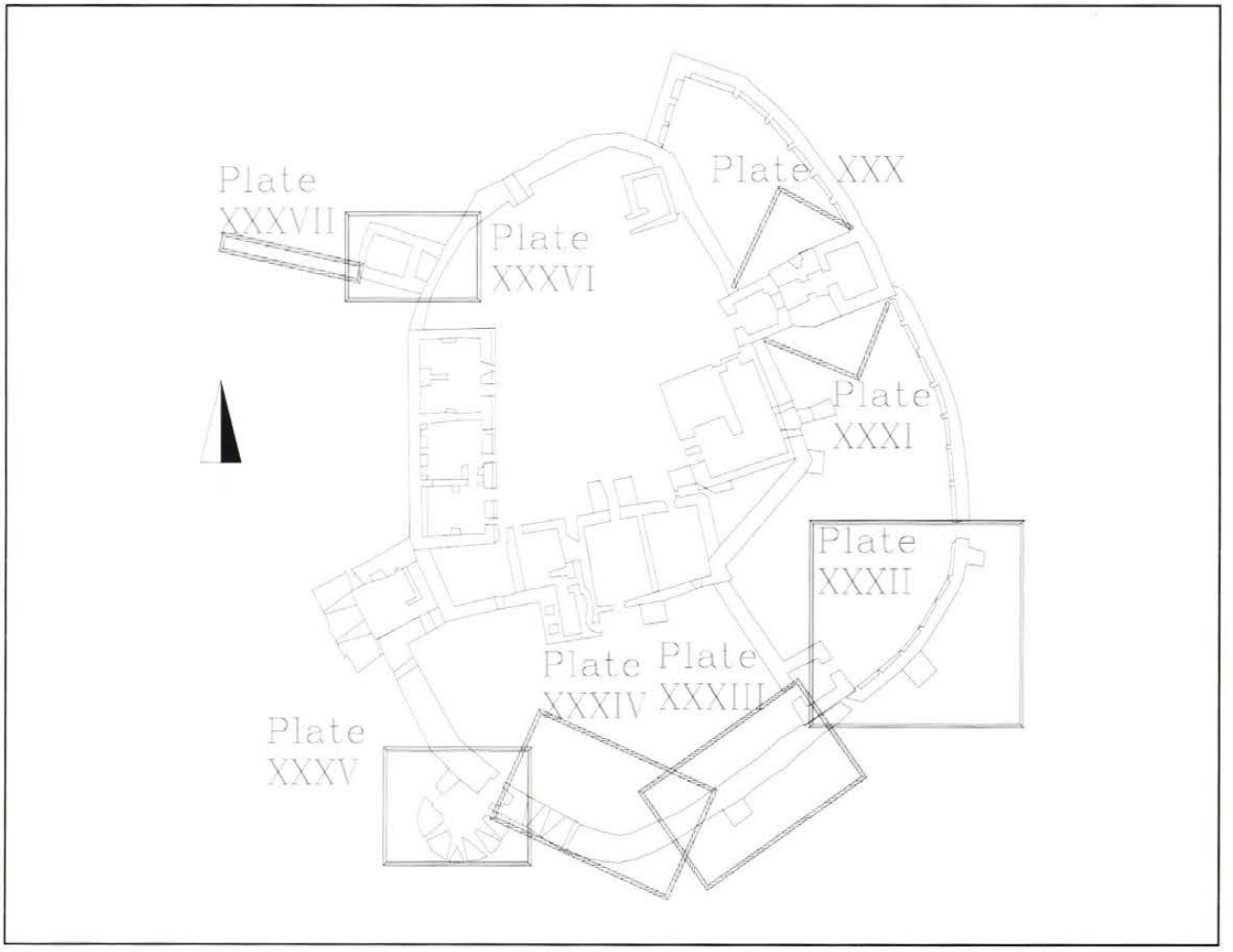


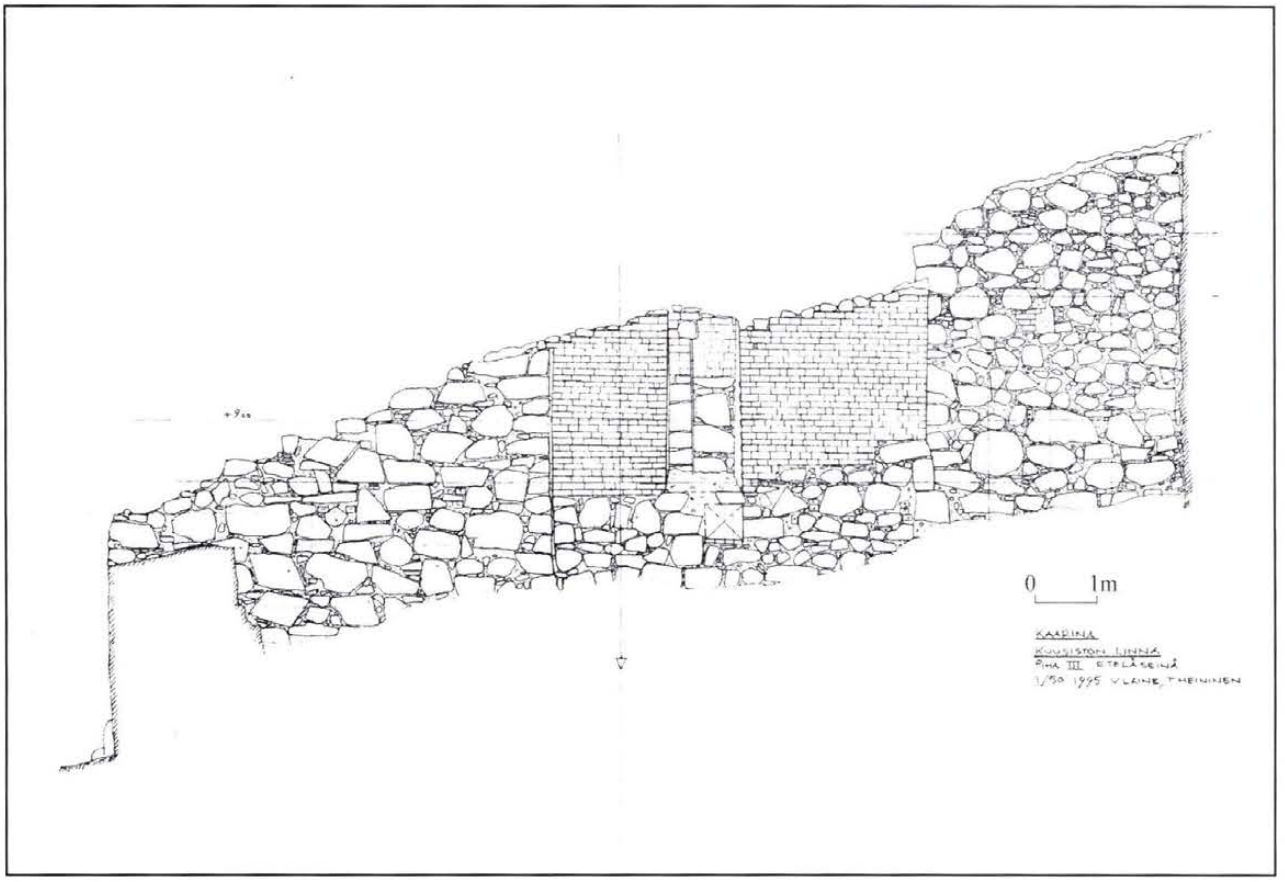
Plate XXIX.

APPENDIX 2
Maps and plans of Kuusisto Castle.

The material is mostly in 1:50 scale in A1-A2 format. The maps and plans have been reduced in size for the present study to A4 format (not to precise scale).
NBA = Department of Monuments and Sites of the National Board of Antiquities

Plate XXX	Kuusisto Castle. Outer bailey III. South wall. (Towers D, E, F, G north outer wall) Elevation (NBA archives: Kuusisto castle).
Plate XXXI	Kuusisto Castle. Outer bailey II. North wall. (Towers D, E, F, G south outer wall) Elevation (NBA archives: Kuusisto Castle).
Plate XXXII	Kuusisto Castle. Outer bailey II. Plan and sections of the south part of the outer wall. ~1:100 (NBA archives: 206.2.72).
Plate XXXIII	Kuusisto Castle. Outer bailey I. Outer and inner face of the southeast section of the outer wall. Elevation. (NBA archives: 206.2.60).
Plate XXXIV	Kuusisto Castle. Outer bailey I. Outer and inner face of the southwest section of the outer wall. Elevation (NBA archives: Kuusisto Castle).
Plate XXXV	Kuusisto Castle. Outer bailey I. Tower B. Plan and sections of the outer wall. (NBA archives: 206.2.15).
Plate XXXVI	Kuusisto Castle. Tower 12. Outer walls. Elevations. (NBA archives:206.2.51).
Plate XXXVII	Kuusisto Castle. Tower 12. West tower and earth layers (8603) Profile section. (NBA archives: Kuusisto Castle).





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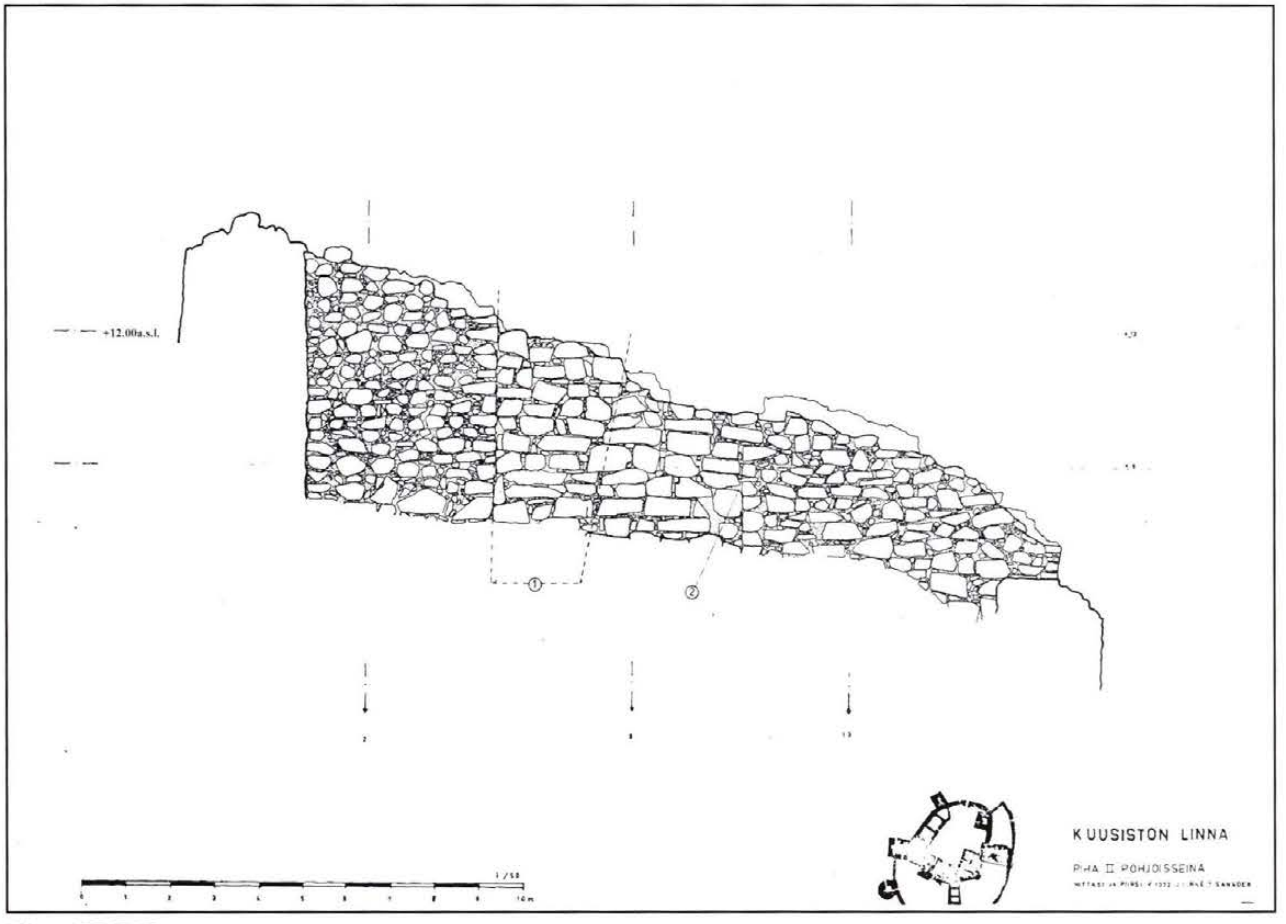

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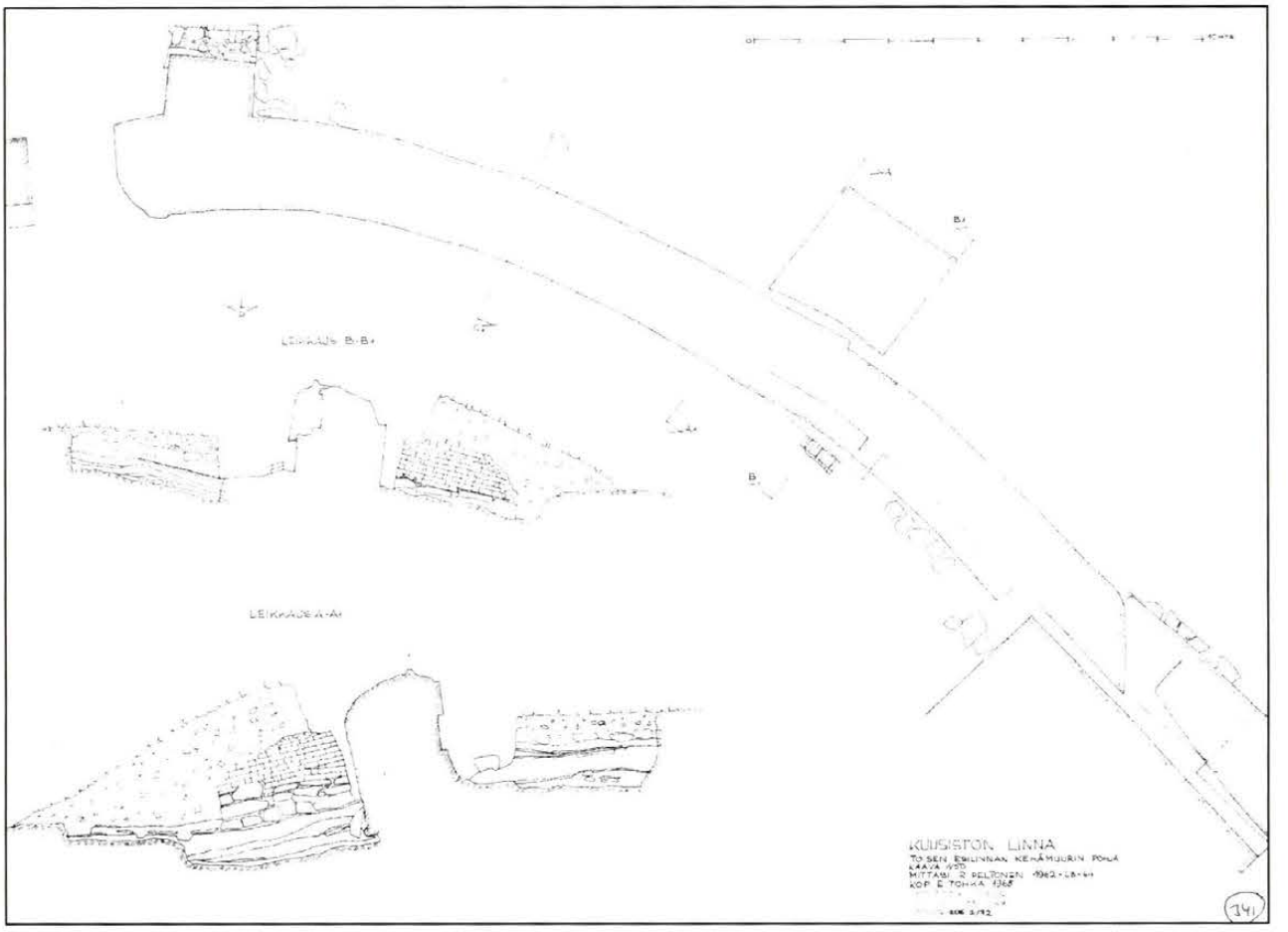

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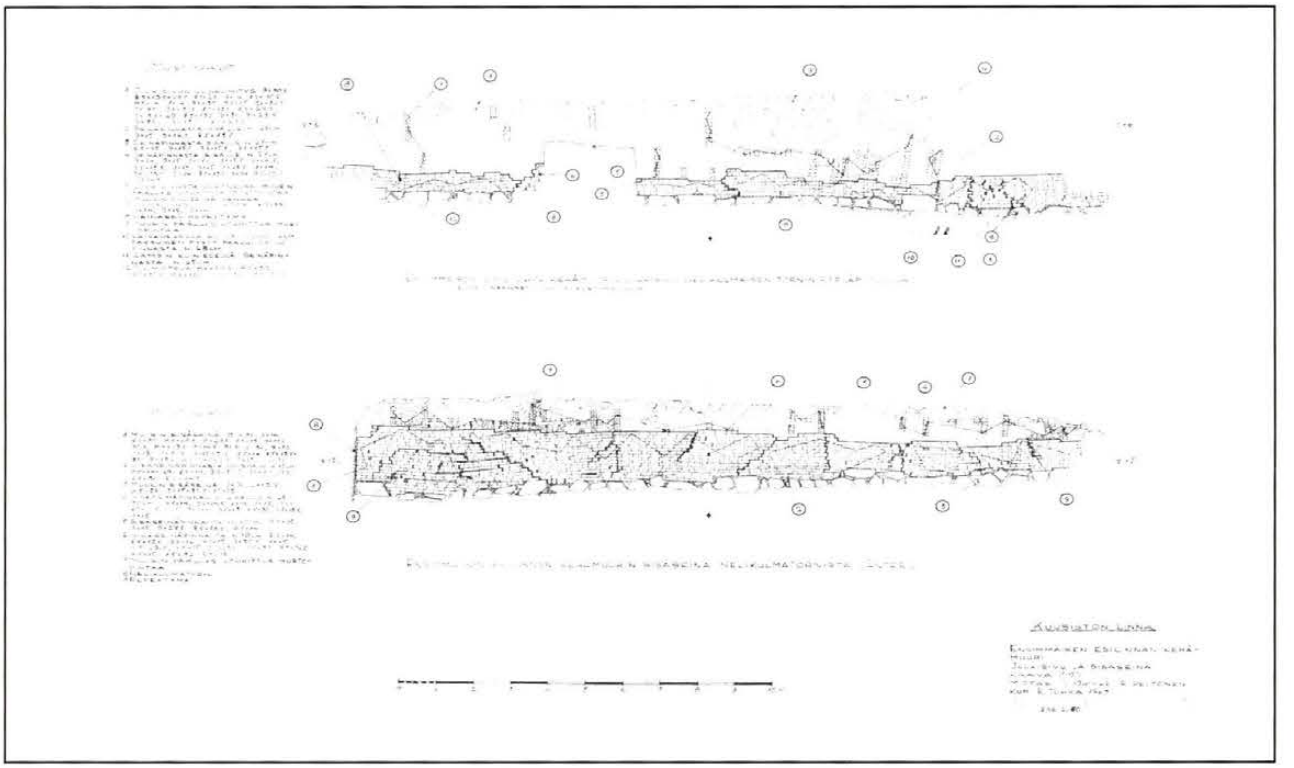

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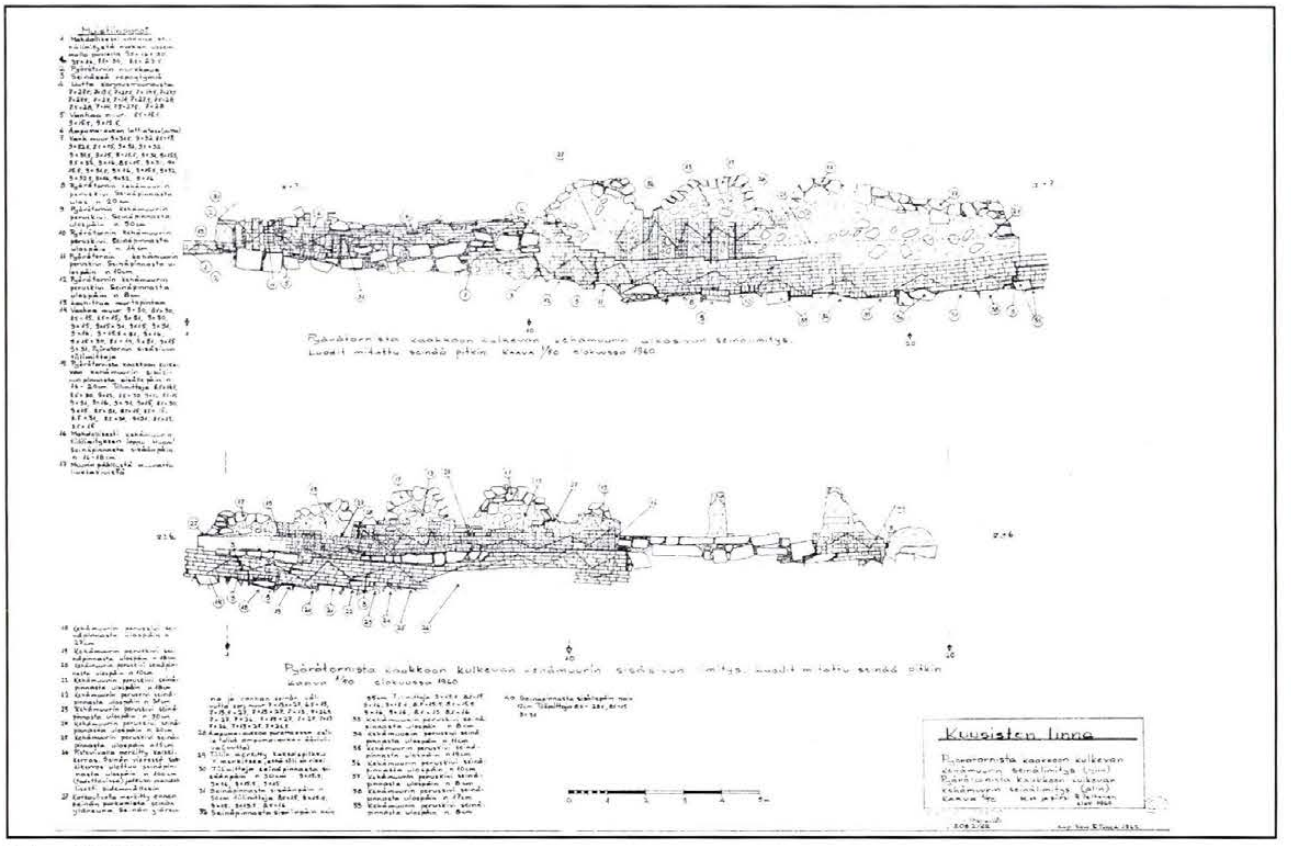

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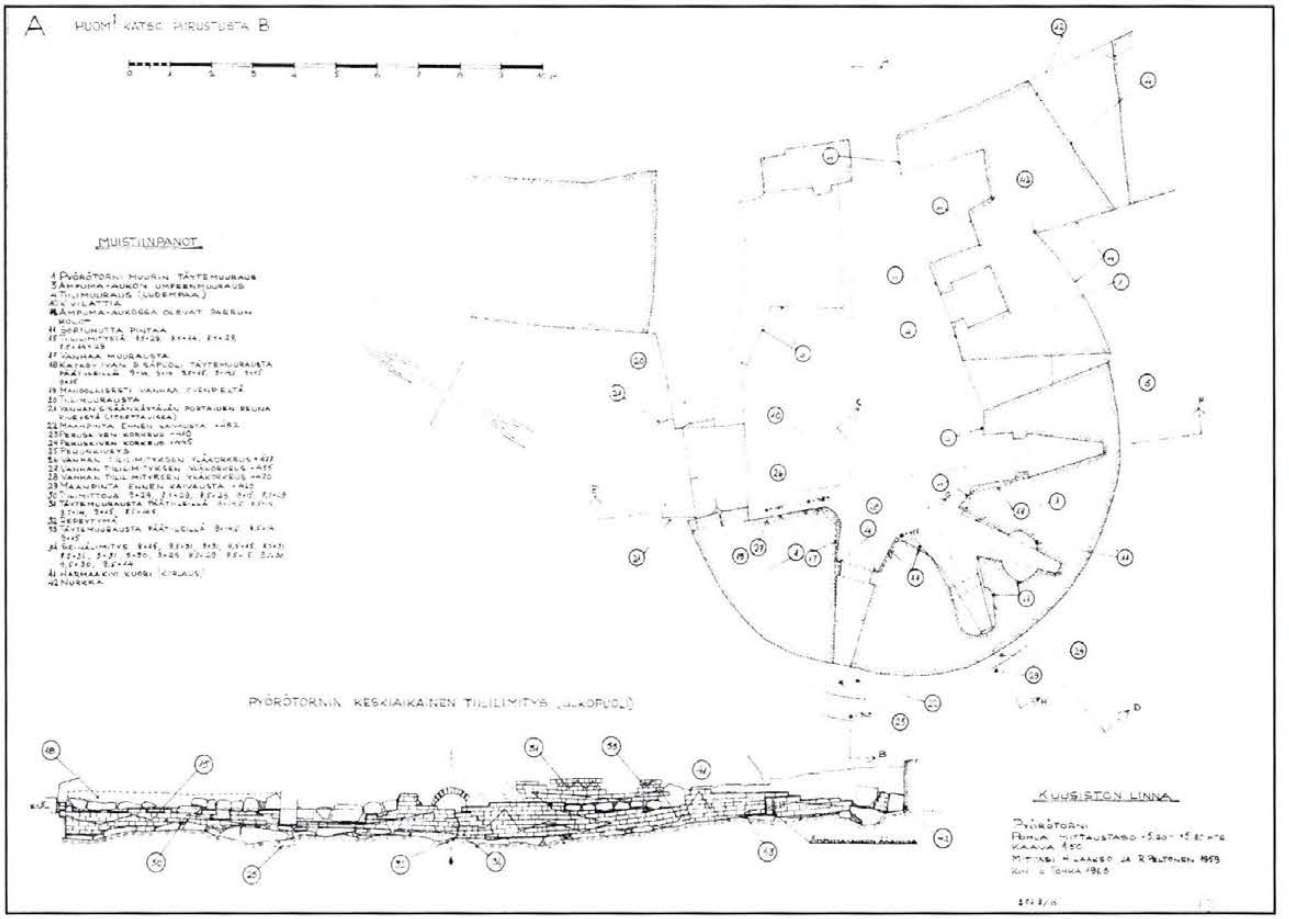

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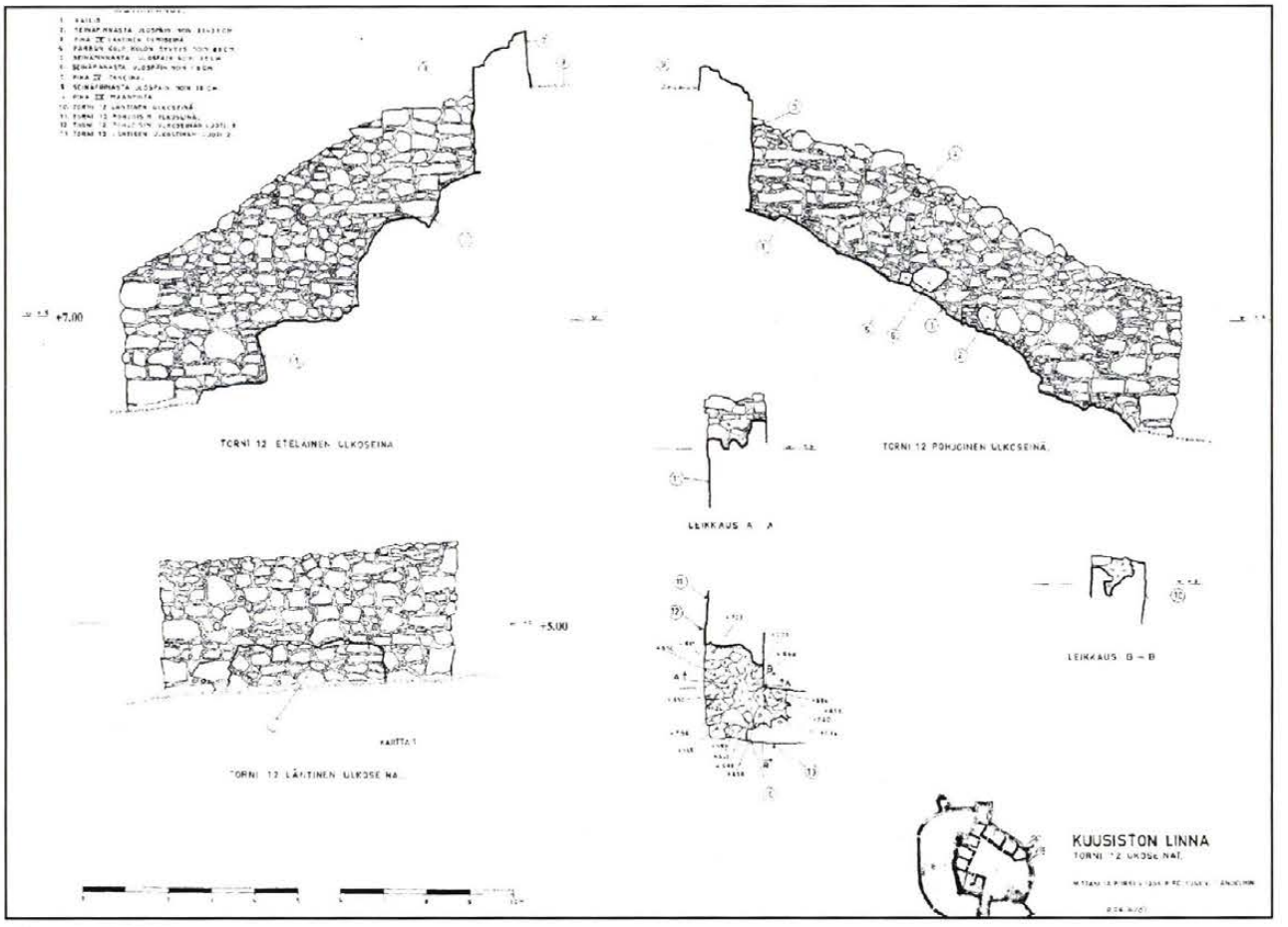

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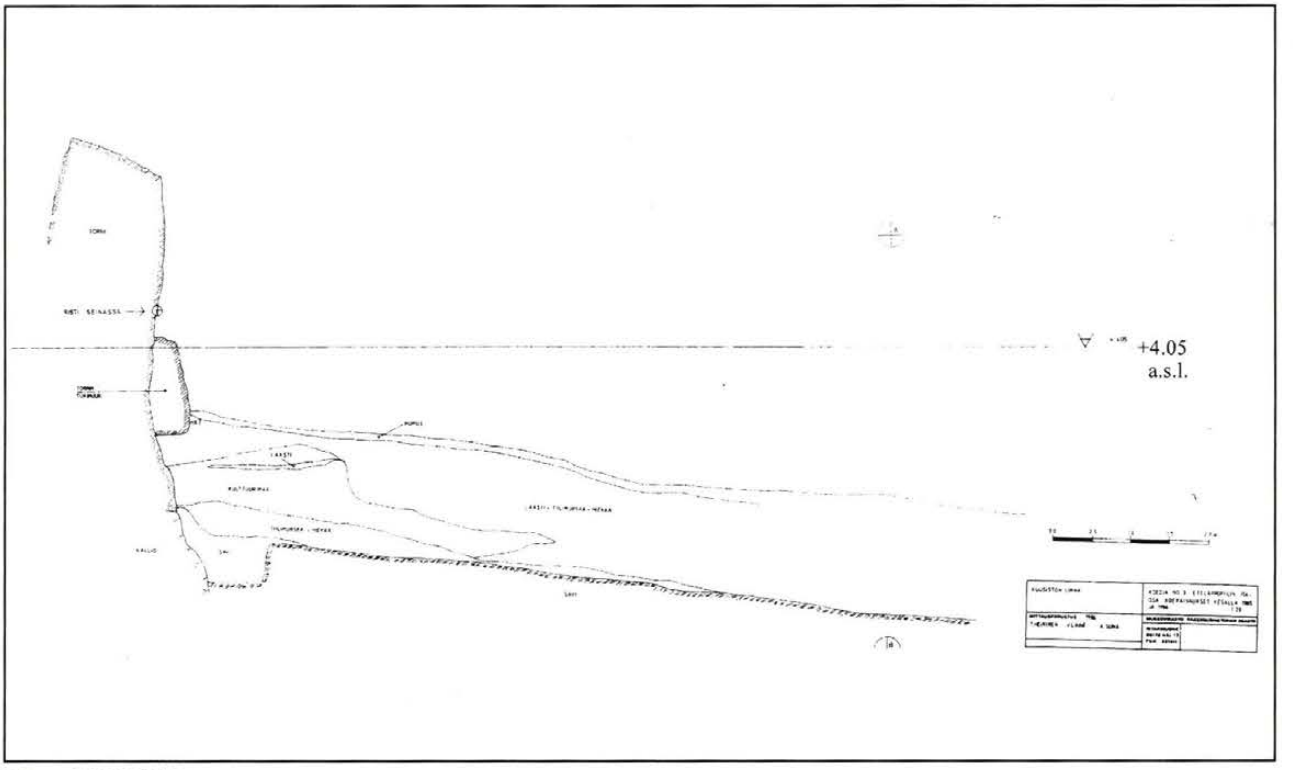

Plate XXXVII.

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I Castella Maris Baltici 1. The proceedings of a Symposium held in Turku, Finland, on 3-8 September 1991. Stockholm 1993.

II Castella Maris Baltici 2. The proceedings of a Symposium held in Nyköping, Sweden, on 3-9 September 1993. Nyköping 1996.

III Kari Uotila, Medieval Outer Baileys in Finland. With Special Reference to Turku Castle. Dissertation, Turku University. Turku 1998.

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