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*Åländska kyrkor berättar* endast kan rekommenderas som ett exempel på hur man inte bör förfara.

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## A Reply to Hiekkänen Regarding the Medieval Churches of Åland

### »Local Nationalism«

Hiekkänen compares me to Matts Dreijer for emphasising the importance of the Åland Islands in the enigmatic period AD 1000–1200 and the later Middle Ages. When I referred to Åland being more densely inhabited than the Lake Mälaren area in the Viking Age, I did not quote Dreijer but Åke Hyenström, once professor of archaeology at Stockholm University, who made this claim at a historical seminar at Åbo Akademi in 1990. I have interpreted the much-disputed Unni cross in Sund as a sign that Bishop Unni's missions did indeed include the islands in the Baltic, as stated by Adam of Bremen. I have compared the Sund cross with an oral tradition about a wooden cross commemorating Bishop Unni, "the first apostle of the Gutar", at Klinte in Hunninge on Gotland (Ringbom 1986, p. 40). About the period AD 1000–1200 I have written very little, except to say that it is not yet fully investigated, but that I find the theory of a settlement hiatus increasingly unlikely. I have also emphasised that the churches of Åland are secondary in relation to neighbouring areas such as Gotland and Uppland.

### *The Pace of Publication*

It is true that the edition of the churches of Åland has taken too long. The delay has mainly been due to our involvement in developing the mortar dating method. Internationally the development still continues, but for the churches of Åland we

are finally seeing the outlines of the chronology. Since there is also earlier unpublished archival material available for all the churches, it seemed like an optimal time to publish a general survey. Hopefully I will find the time to continue the series of monographs with detailed information of each church.

### *Mortar Dating*

"Why the need to develop a method claimed reliable already 15 years ago?", asks Hiekkänen. Although mortar analysis of non-hydraulic Ordovician and Silurian limestone (Åland and Gotland) so far seems to be uncomplicated and successful, we have come across results that are less easy to understand for hydraulic pozzolana mortars (ancient Roman ruins, including the Colosseum). Here we need to focus on the best chemical solutions for concrete based on volcanic ashes, and on results from lumps of thoroughly fired limestone or marble. We are also involved in ongoing experiments on mortars based on seashells and chalk, and we need to learn more about analysing mortars based on Precambrian limestone on the Finnish mainland. The development of mortar dating will never end.

In 1997 we applied mortar dating to sites of Classical Antiquity in Portugal, Spain, Rome and other parts of Italy with varying success due to differences in the mortar composition. We have recently published these results in four papers in a peer-reviewed journal.

“The team has also been guilty of neglecting good research praxis, and dishonesty in research – they have fabricated unsubstantiated results for the dating of the church in Vårdö”, writes Hiekkänen. In 2005 mortar dating was the subject of a doctoral thesis by Alf Lindroos, a member of our team and responsible for the natural-science methodological development. Hiekkänen (2008; 2010) has repeatedly claimed that our dating of Vårdö church has been manipulated. I replied to this serious accusation both in 2008 and in 2010, in vain. Once more: the volume on Sund and Vårdö churches was written parallel to Alf Lindroos's dissertation. I therefore found it necessary to refer to his analysis of the effects of aggregate carbonates on mortar dating, where he presented samples Vaka 001–003 (p. 55) as an image of three highly contaminated profiles. Lindroos wrote: “The charcoal inclusion (sample Vaka 005C) and the first increments probably yield coarse estimates of the age of the church, but the results have not been used for archaeometric purposes.” In addition to the three samples mentioned, there was obviously a need to analyse Vaka 005, that is, the very mortar sample including the charcoal. We received the results in 2009. The first fraction of the mortar sample Vaka 005 yielded very similar results to the charcoal (Heinemeier et al. 2010, appendix; Ringbom 2010a, p. 145, figs 183c, 183d). We only use charcoal to determine *terminus post quem* because of the old wood effect. Never in our experience, however, have the results from analysing charcoal embedded in the mortar been too recent. In Vårdö both charcoal and mortar coincide with the dendro date for the northern wall plate, around 1470.

#### *Different Methods of Research*

Hiekkänen reviewed my book *Åländska kyrkor berättar* on-line in 2010. This piece follows the same outline as his present article in *Fornvännen*, but in Finnish, and I replied in Swedish. I have now decided to take part in this seemingly endless “debate” that has been going on for almost 20 years. The only way forward is to deal with the basic issue: the differences in our approaches to reaching an objective chronology for the churches.

Hiekkänen may be worried that our results might raise questions about the validity of his

own chronology. In my on-line reply, I pointed out that he did not present his methodological principles transparently in 2007 when he modified the dates he had published in 1994. He responded in general terms that I should consult his dissertation. Even if Hiekkänen admits that things may have changed since 1994, as for instance in the cases of Nousiainen and Keminmaa, he offers no specific references or explanations, only a survey of all his publications. No explanation is offered for his changed dates for some of the churches of Åland (tab. 1). It is therefore relevant to his return to his dissertation (1994a). Since then Hiekkänen has also published mainly in Finnish, which makes it difficult for an international audience to follow his research.

In 1994 Hiekkänen presented a new chronology for the Finnish churches. In his view they are considerably younger than previously believed. All the different building units (chancel, nave, tower) are supposed to have been added within a short time span at each site. In an article, also from 1994 (1994b), he presented a more detailed chronology of the Finnish churches including all their separate building units.

As the basis for his revised chronology, he introduced a new approach in using an intuitive statistical interpretation of his field observations. He created a systematic database of comparative criteria: the dimensions of the ground plan, the connections of the components with the nave, the different features of the doorways, the fenestration, wall recesses and niches, attic stairways, exterior pulpits, gable ornaments, attic openings and vaulting.

Traditional dating tools, such as written sources, coins and other small objects, played a minor part in his investigation. Existing dendrochronological analyses from some of the churches, including analyses initiated and published by myself for the churches of Åland, but not always properly referred to (Hiekkänen 2003, pp. 45, 216, 220, 222), provided meagre scientific substantiation for the dates. Church records were not thoroughly investigated, allowing post-Reformation alterations to sneak into into the statistical database, for instance in the dimensions of the windows in Finström and Eckerö churches.

As a result Hiekkänen divided the churches in

	<b>Hiekkänen 1994b</b>	<b>Hiekkänen 2007</b>	<b>Ringbom 2010/11</b>
Eckerö	1350–1450	1380–1420	1275–1300
Finström	1440–1460	the 1440s	end of 13th C?
Föglö	1350–1450	1450-/1500–1520	14th C
Geta	1480–1550	1510–1540	1435–1455
Hammarland	1300–1430	beg. of 14th C	1265–1285
Jomala	1260–1280	1275–85	tower 1270–1285, nave earlier?
Kumlinge	1490–1510	1500–1510	14th C
Kökar	1450–1500	beg. of 16th C	14th C
Lemböte	1480–1550	before 1530	1295–1310/1360–87
Lemland	1290–1310	end of 13th C	end of 13th C
Saltvik	1300–1380	around 1370	1270–1296
Sund	1300–1400	1290–1310 / c. 1300	1255–1280
Vårdö	1500–1650	1520–50/1550s	1430–1500

Tab. 1. A comparative presentation of the chronology for the naves in the Medieval churches of Åland. Apart from Jomala and Lemland, where he uses dendrochronological analyses from the Åland churches project, Hiekkänen's results differ from our chronology. A transparent explanation of the revised dates of the churches in Föglö and in Kökar would be most welcome.

Finland into three distinctive groups: A and B on the mainland, both belonging to the 15th century, and C in the Åland Islands that was slightly earlier. Turku Cathedral he first considered to have been erected towards the end of the 13th century, but then his opinion changed and he placed this building too in the 15th century.

The Åland Churches project uses another approach. After years of guesswork presented by various scholars, it was a challenge to reach an objective and reliable chronology. Therefore in 1990, from the very start of the project, it was clear that we would consider all available interdisciplinary methods, both traditional humanities means of dating and more objective natural-science methods. We took the few contemporary written sources into account, as well as the stylistic dating of murals and wooden sculpture. Coins and archaeological small finds were important. First among the scientific methods we used was dendrochronology. We applied it to well-preserved structural wood, later also to wooden sculpture. Less well-preserved wooden structures, not datable by dendrochronology, underwent radio-

carbon analysis together with other organic materials. Yet we could not pinpoint the first stages of the naves – probably due to lack of preserved timber. For this AMS radiocarbon analysis of the mortar was needed, since mortar is usually available in large quantities and from every single building stage. From the outset, the Åland Churches project has focused on developing the method of dating mortar. Switching from once-conventional radiocarbon dating (large samples) to AMS radiocarbon dating (which requires only 1 mg of carbon) in 1994 meant a decisive improvement.

For control, we have compared the results from the mortar dating to those from other dating methods targeting other materials. The agreement is striking. For instance, out of 38 cases where mortar dating could be compared to dendrochronology, 36 reached identical results. All our results from dendro, radiocarbon dating of organic materials such as charcoal and organic particles embedded in the mortar and every single CO<sub>2</sub> fraction from mortar dating has been accounted for in international peer-reviewed journals (most importantlt Heinemeier et al.

2010). Chapter 3 of *Åländska kyrkor berättar* presents methods and results previously published by the entire team. The results from 150 mortar samples are compared to results from 79 radiocarbon analyses of wood, samples of organic material embedded in the mortar and dendrochronology from the Middle Ages. Hiekkänen ignores the fact that more than half of the results of mortar dating are backed up by independent analysis of other materials with other methods, and that of these over 90% reach identical results. Maybe it is also worth mentioning that all criticism of our research into the churches of Åland and our involvement in the developing of mortar dating comes from Hiekkänen and his close circle. Internationally and scientifically, the value of our efforts has not been questioned. Readers may judge for themselves whether we have fabricated our results from Vårdö or anywhere else.

Finally a quotation from Hiekkänen 2010 summarising his position: “It is quite obvious that mortar dating gives consistently older results than the *real age* [my italics] . . . Mortar dating cannot be used for Åland churches or other buildings”. Apparently he knows the real age of the Åland churches and other buildings. We do not, and that is why we rely on interdisciplinary scientific methods, including mortar dating, to arrive at a more accurate chronology.

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