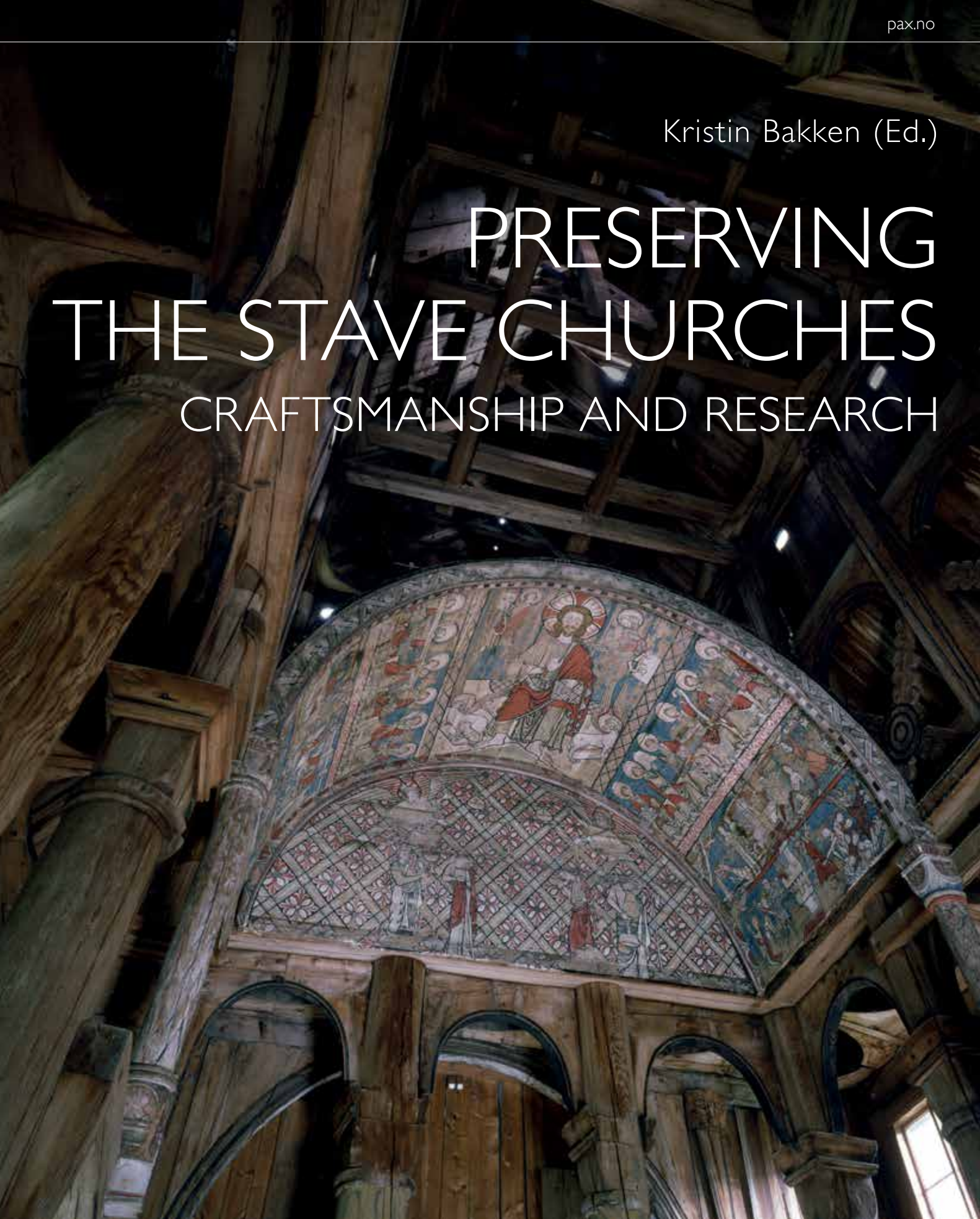


Kristin Bakken (Ed.)

PRESERVING THE STAVE CHURCHES CRAFTSMANSHIP AND RESEARCH



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Craftsmanship and Research

Translated by Ingrid Greenhow and Glenn Ostling

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CONTENT

Preface 11
JØRN HOLME

Introduction 13
KRISTIN BAKKEN

1. What is a stave church? 17
LEIF ANKER

2. A Preservation Plan for the stave churches in Norway 23
SJUR MEHLUM

3. The colourful church interior 47
MILLE STEIN and IVER SCHONHOWD

4. «To the Glory of God and the Church's Adornment» 69
TONE MARIE OLSTAD

5. Dendrochronology brings new life to the stave churches 91
TERJE THUN, JAN MICHAEL STORNES, THOMAS SEIP BARTHOLIN
and HELENE LØVSTRAND SVARVA

6. The role of the craftsman in cultural heritage protection 117
TERJE PLANKE

7. Between a temple and a house of cards 135
LEIF ANKER

8. A complex field of knowledge 167
RAGNAR PEDERSEN

9. Work undertaken in the Stave Church Preservation Programme 191
LARS DANIELSEN HOLEN

Notes 207
Literature 227
About the authors 241
Index 243

PREFACE

The Stave Church Preservation Programme was started in 2002. The opening was launched at Nore stave church by Børge Brende, then Cabinet Minister, in September of that year. Assessments on the maintenance needs of all the churches had been made in previous years and a pilot project had been implemented. These preparations showed that 20 of the churches were afflicted with serious structural problems. Norway's Directorate for Cultural Heritage was granted fresh funds to lift all of the country's 28 stave churches up to a normal level of maintenance by the end of 2015.

Ellen Devold, Senior Advisor at the Directorate for Cultural Heritage, served as the first Project Manager for the Stave Church Preservation Programme. At the turn of the year 2006-2007 she was replaced by Sjur Mehlum, also a Senior Advisor at the Directorate, and he led the programme to its completion. Harald Ibenholt, Head of Section for Conservation, was responsible for its progress the entire period. The programme was implemented according to plan and the ceremony marking the completion of the Programme was attended by Tine Sundtoft, then Cabinet Minister, in Ringebru stave church in September 2015.

Fortunately, the funding was sufficient to include church art in the preservation programme. Here too, assessments and pre-project works were initiated which revealed acute preservation challenges. Iver Schonhowd, Specialist Director at the Directorate for Cultural Heritage, supervised the conservation work throughout the programme period.

By most criteria the Stave Church Preservation Programme has been highly successful. Its final cost was NOK 130 million, a sum which was spent in the course of 14 years. The state funding represents an essential investment in this part of our cultural heritage and it currently represents the pinnacle of state efforts on behalf of the stave churches. Norway has the responsibility for the proper upkeep of this unique part of our cultural heritage, and accordingly we are shouldered with the task of maintaining knowledge and competence in this sphere. The Stave Church Preservation Programme lacked an earmarked research component. Nevertheless, once underway the programme led to significant development in our knowledge regarding stave churches. This is knowledge which should be documented and shared for the benefit of public administration and academia.

We are aware that stave church research in Norway is on the verge of a generation shift. To stimulate and ensure the field of research on which the administration of the stave churches relies, the Directorate for Cultural Heritage has decided to culminate the Stave Church Preservation Programme with this research publication. We hope this book manages to disseminate knowledge gained during the programme period and stimulate future research in the area.

JØRN HOLME, May 2016

Director General

The Norwegian Directorate for Cultural Heritage

INTRODUCTION

On April 12th 1850, 500 *speciedalers* were granted by royal decree to support the restoration of Heddal stave church. This marked the start of a long history in which the Norwegian State has taken financial responsibility for our stave churches. The grant in 1850 was given to *Fortidsminneforeningen*, the Society for the Preservation of Ancient Norwegian Monuments, the organisation charged with supervising the restoration of Heddal stave church at that time. Our views on cultural heritage and their value have evolved considerably since 1850. However, the status of the stave churches in historical and conservation circles, as well as amongst the public in general is formidable. Fortunately, the state's motivation for assuming financial responsibility for the stave churches is still high. The Stave Church Preservation Programme, which recently ended, palpably testifies to this commitment.

The Stave Church Preservation Programme has had visible and tangible results, and all 28 stave churches in Norway are now in a good state of repair. For the time being, they will generally only require an ordinary degree of maintenance. As the programme came to an end, it was also immediately clear that the *tangible* result of the investment was not the only gain. The programme also represents an investment in the understanding we have regarding these special buildings and has generated new knowledge. One of the aims of this book is to thematise and disseminate this accumulation of knowledge. In addition to presenting the 28 rehabilitated stave churches to the general public, to visitors

from abroad and for posterity, we now wish to present the significant experiences and acquired learning that the extensive work on the stave churches has produced as a by-product.

I use the word *by-product* here intentionally, because within the framework of the NOK 130 million spent in the course of the programme period, we lacked financial leeway for a parallel, targeted research programme. In retrospect this is to be regretted, as this enormous programme of work has literally paved the way for further research and investigations. Opportunities arose to conduct archaeological excavations when church floors were removed, while architectural history investigations could be made while scaffolding was up, roof shingles off or ridge turrets accessible. Within the programme's financial limits, we were able to exploit some of these research opportunities. The same goes for the work on church art and distemper paint decoration as well as dendrochronological dating. However, these activities always played second fiddle to the programme's preservation objectives.

It might therefore seem paradoxical that the Directorate for Cultural Heritage is now publishing a collection of *research articles*. The objective is to bring together this new knowledge, despite the programme's lack of an explicit focus on research. As far as possible, we would like to comment and reflect on information accrued during the programme period and make the results available to the research community and for future research.

This is the background for the second aim of this book. We must recognise that, paradoxically, the research field which has empirically studied stave churches since J.C. Dahl documented them in his publication *Denkmale einer sehr ausgebildeten Holzbaukunst aus den frühesten Jahrhunderten in den innern Landschaften Norwegens* (1836–37) is currently on its knees. While working on this book we were keen to see how stave churches might be included in reading lists for relevant subjects in Bachelor’s and Master’s degrees in the university sector. Who has research competence in this field today and do the same people have positions in the university or research institute sectors? The result of this survey was disheartening. It confirmed our suspicion that Norway’s national research competence regarding stave churches is not only inadequate – it is worryingly deficient.

It would be tempting to comment on the reasons why stave church research has virtually vanished from the wide array of academic interests, but this is no place for a lengthy analysis. Nevertheless, the situation is the same for much of our other “national empirical data”. (For a more thorough discussion, see Bakken 2016.)

In this connection I wish to stress that from the perspective of the Directorate for Cultural Heritage, stave church research (and other research on national cultural heritage) is essential, applied research. We are harnessed with the responsibility for the solid, research-based management of these edifices and we need the advice of experts.

The stave churches are Norway’s unique contribution to world architecture and it is both interesting and alarming that academic interest in stave churches is so paltry here at home, while there is much greater interest abroad. We currently have few experts to whom we can refer when receiving queries from abroad about Norwegian expertise in this subject. So the second aim of this publication is to stimulate new activity in the field. It is not enough to have 28 restored stave churches in Norway. The country must also have the requisite expertise and competence to ensure that their management is based on knowledge and research. We must ensure that foreign research institutions are not encumbered with this task by default.

We hope the process of working on this book has also bolstered the research field. The Directorate for Cultural Heritage has organised two work seminars in

this context which attracted a wide spectrum of interested parties and institutions. Chapters from the book, in the form of lectures, also formed the core of the programme at a conference on stave churches organised in June, 2016.

With this backdrop, whom do we wish to reach with this book? Clearly, we want to reach those who currently have a research interest in stave churches. This particularly includes students who might be encouraged to focus their studies or future research on this subject. Any approach must be multidisciplinary: building historians, art historians, medieval historians, conservators, architects and archaeologists are all part of the target group. We also want to connect with those who take care of the stave churches today, whether they are private owners or public administrative bodies, to guarantee that their work is conducted on as professional a basis as possible. Some of the contributions should also stimulate the interest of practising restoration craftsmen. We have chosen to publish the book in English as well as Norwegian in response to the international interest in stave churches from scientists, museums and administrative bodies.

The book is comprised of eight chapters and a final summary. To write the eighth chapter, we invited Ragnar Pedersen, Conservator and Professor Emeritus at the University of Oslo. He proof-read his own chapter before he unexpectedly, and very sadly, passed away in June 2016. The summary is the work of Sjur Mehlum and Lars Danielsen Holen. It provides a short description of each church and documents on a general level what has been done in each church in the course of the programme. The complete work reports will be available on the internet, in the Open Archive of the Norwegian Directorate for Cultural Heritage. Much of the earlier work on restoring and preserving the stave churches was poorly documented by today’s standards. In the wake of the Stave Church Preservation Programme we hope the documentation will improve, and that future scholars will have a broader platform to start from when they evaluate both the building history and the management history of the individual churches.

The first chapter defines the stave church structure. This definition is significant when putting their total number at 28. Leif Anker concisely presents the construction method that distinguishes stave churches as a category of building.

Sjur Mehlum explains the professional conservation decisions made during the programme with a focus on practical and ideological considerations. He explains and reflects on his own methods so they can be analysed and investigated in the future. A prime point of departure for this chapter is the lack of comparable source material during the previous 165 years of stave church conservation

Mille Stein and Iver Schonhowd address the conservation of the art within the stave churches. NOK 25 million of the 130 million allocated to the stave church programme were spent on church art. Stein and Schonhowd reveal the practical and ideological decisions made in their work and highlight and discuss examples which have spawned new understanding and knowledge.

Tone Marie Olstad expounds on the distemper paintings which distinguish the interiors of the churches today, and emphasises the work done to conserve this vital aspect of the stave churches. In some cases the decoration is from the Middle Ages, but generally it comprises works from the post-Reformation period. Olstad discusses findings made during the conservation work, with regard to both content and to discoveries in artistic methods.

Terje Thun together with Jan Stornes, Thomas Seip Bartholin and Helene Løvstrand Svarva, explains the dendrochronological analyses carried out at the stave churches. In this chapter we are presented with the first overview of the current status of dendrochronological work, both prior to and in the course of the programme. This chapter provides essential empirical results for dating the stave churches and knowledge of the wood and timber from which they were constructed.

As work progressed on the Stave Church Preservation Programme, it became clear that practical work on the churches by craftsmen generated questions and answers that had not previously been documented in stave church research. Terje Planke approaches this subject by analysing and discussing three types of written

documentation which the craftsmen produced while working. One of the aims of this study is to discuss how this kind of documentation can be developed to serve research purposes. On the other hand, he analyses the roles of the craftsmen in the preservation of the stave churches, comparing these to the roles of advisors and researchers.

The seventh chapter relates the history of research on the stave churches from the very beginning until today. What has been done, how and why? Leif Anker's contribution shows that many research topics have been ignored during the programme period. They were not directly triggered by the restoration work, nor could they be implemented as natural by-products of the conservation programme.

Ragnar Pedersen's goal is to reflect on the situation of stave church research in the framework of philosophy of science. Paradoxically, his chapter depicts Norwegian stave church research as a largely unploughed field, with regard to a scientific, theoretical level of consciousness and in the scope of questions which could be approached.

The editorial team for the book consists of Leif Anker, Sjur Mehlum, Anders Amlø (photo editor), Anne Nyhamar (sub-editor) and Kristin Bakken (Editor). The book has been subjected to an anonymous peer review.

I hope this work will provide a constructive contribution to the future administration of the stave churches and that it will help ensure that their management in the future is administered based on updated research-based knowledge. It is also my hope that the book will stimulate the fields of research that incorporate the stave churches.

KRISTIN BAKKEN

Director, Department for Resources and Development, the Norwegian Directorate for Cultural Heritage

I. WHAT IS A STAVE CHURCH?

LEIF ANKER

The term stave church refers to the way the church was built. Stave construction is a method of building with posts – staves – as the load-bearing elements.

In principle, a stave building is a frame construction consisting of horizontal and vertical elements resting on stone foundations on the ground. The Norwegian word for stave churches is *stavkirker*. The name derives from the Old Norse *stafr*, and the term meant a pillar or post – the vertical posts in the stave building’s framework. The sill beams make up the lower horizontal frame. These beams are either cog-jointed to the corner staves, in which case the latter are placed over the notched logs, or they are dovetailed into grooves in the corner staves and secured with large wooden pegs. The stave construction’s upper frame consists of wall plates which fit into notched tracks on the top end of the staves. The wall surfaces consist of vertical wall planks. These are interconnected by the tongue-and-groove method, and dovetailed into a slot or groove in the wall plates and wall sill beams. Most stave churches have, or used to have, a raftered roof in which the panels in the gables are joined using tongue and groove with a notch in the rafters. Corners and angled joints are strengthened with brackets, made with the wood from the transition between a tree’s roots and its trunk, where the fibres are strong and bent at an angle.

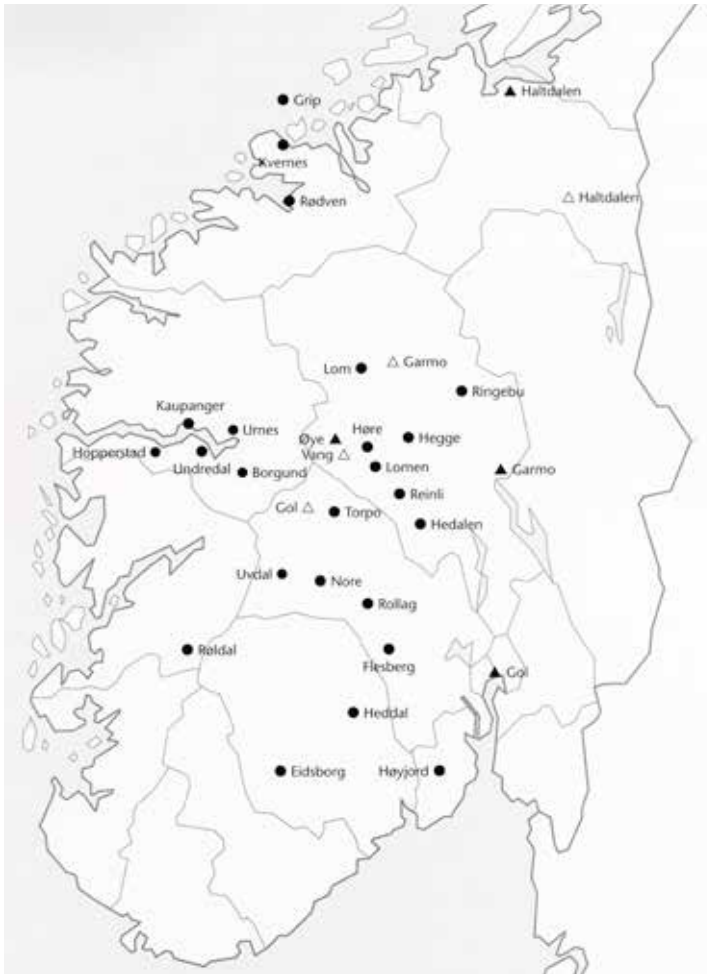
A total of 28 medieval stave churches have survived in Norway. Two of these have been reconstructed from rediscovered elements, but the others have survived *in situ*. All the surviving stave churches have been reno-

vated and modified over the course of the centuries. Some have been altered so much that their original design is very hard to determine. The demarcation lines between what can be designated a stave church and what is simply a wooden church with stave church elements are thus quite narrow. Many churches built after the Reformation (1537) consist largely of recycled materials from older stave churches.

In addition to the surviving stave churches located in Norway, in the 1840s a stave church from Vang in Valdres was moved and erected in Bruckenberg, Prussia, which is now Karpacz, Poland. A stave church has also survived in Sweden, at Hedared, not far from Borås in Västra Götaland county. This is the last of the numerous Swedish stave churches. A stave-like wooden church from the Middle Ages has survived in England. The church, St. Andrews in Greensted, Essex, shares some similarities with stave churches, but its construction places it in a category of its own among Europe’s medieval wooden buildings.

Construction characteristics – four main types

The stave churches are often grouped according to their structural characteristics. Usually they are placed in four main categories: simple stave churches; the “Møre type”; centre post churches and stave churches with an elevated section in the nave and chancel.



Legend: ● = remaining stave churches, ▲ = stave churches moved or reconstructed, △ = original location of stave churches moved. No portals or stave churches from Northern Norway have been preserved.

The “simple” stave churches have a rectangular nave and rectangular or square chancel, without intermediate and inner posts. The surviving churches of this type are:

- Haltdalen stave church at Sør-Trøndelag Folk Museum in Trondheim
- Eidsborg stave church in Telemark county
- Undredal stave church in Sogn
- Rollag stave church in Numedal
- Hedalen stave church in Valdres
- Garmo stave church at Maihaugen, Lillehammer

The “Møre type” shares similarities with the ‘simple type’ without inner staves. In addition it has interme-

mediate posts in the walls and lacks bracket knees in the corners and other right-angled joints. The surviving churches of this type have wall plates perpendicular to the nave. Two of the three “Møre-type” churches also have external support posts bracing the walls, corresponding to the walls’ intermediate posts. We are uncertain whether these were original features. The surviving churches of this type are:

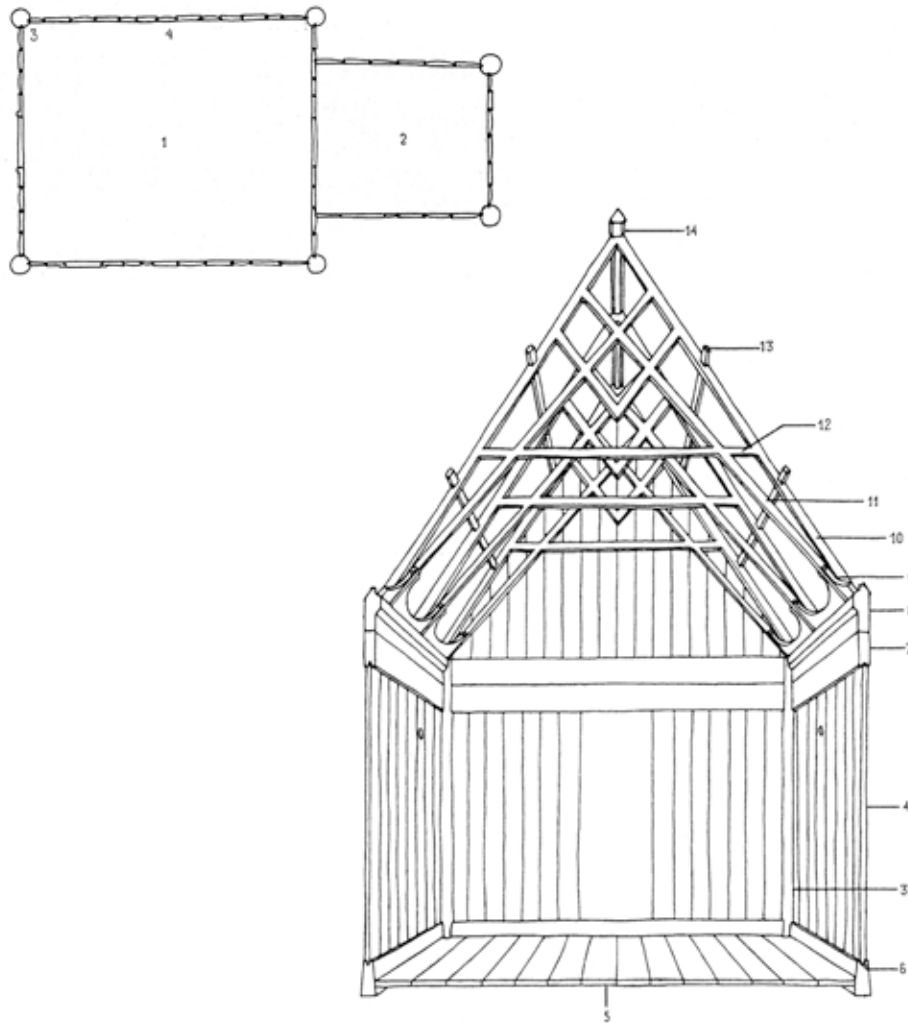
- Rødven in Romsdal
- Kvernes and Grip in Nord-Møre

“Centre post churches” are characterised by their large, centre post, which stretches from the foundations of the nave to the ridge of the roof. The centre post is joined to the wall plates with connecting beams and various connections to other parts of the church’s roof structure. This is how the construction carries the load of towers and any church bells. The surviving churches with centre posts are:

- Nore and Uvdal in Numedal
- Høyjord in Vestfold county, which was given a centre post with an uncertain provenance when it was restored during World War II. The evidence for a centre post is uncertain.

Stave churches with elevated naves have a number of staves, or nave posts, which stand separately in the interior and support the upper part of the construction, the elevated nave. The nave is surrounded by a lower ambulatory on all four sides of the nave and three sides of the chancel. This construction gives these churches their characteristic external profile with one roof above another. These complex constructions, which create unusual spatial conditions, are only known in Norway. In principle, they are built in the same way as the simple stave churches’ framework, but the raised nave churches also have an underlying frame of raft beams on a gravel fill. The raft beams are lashed into each other with the intersecting points positioned slightly in from their ends. The centre posts are dovetailed into the raft beams, while the aisle walls’ sill beams are supported on the outer end of the raft beams.

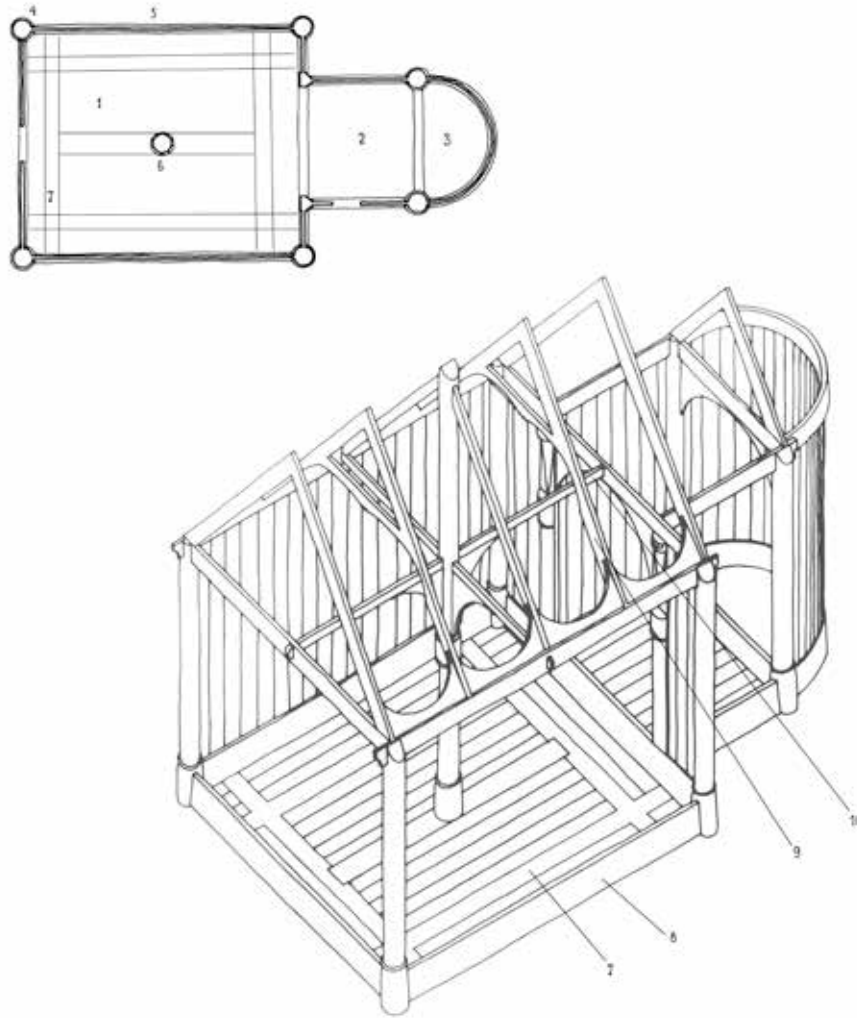
In the church’s interior, the aisle and the nave are joined using an extensive support system of buttresses and beams that are strengthened by quadrant brackets. In all the churches of this type, the nave posts are braced with vertical quadrant brackets below the nave wall,



Church of the so-called simple type, for example Haltdalen stave church. 1) nave, 2) chancel, 3) corner post, 4) wall planks, 5) floor, 6) sill beam, 7) lower wall plate, 8) higher wall plate, 9) quadrant bracket, 10) rafter, 11) scissor brace, 12) collar beam, 13) purlin, 14) ridge piece. Based on a drawing by Håkon Christie.

whereas in the other churches the bracing and design of the nave vary greatly. Some churches have all the nave posts in a longitudinal axis fixed to the raft beams. Others have one or more of the intermediate posts fixed to beams and arches above the floor. In churches with this arrangement, the centre posts are connected with one or two sets of horizontal beams, string beams, which lock them to one another. Cross braces are placed between the posts and the string beams, half-notched together at their intersecting points. The surviving stave churches with a raised nave are:

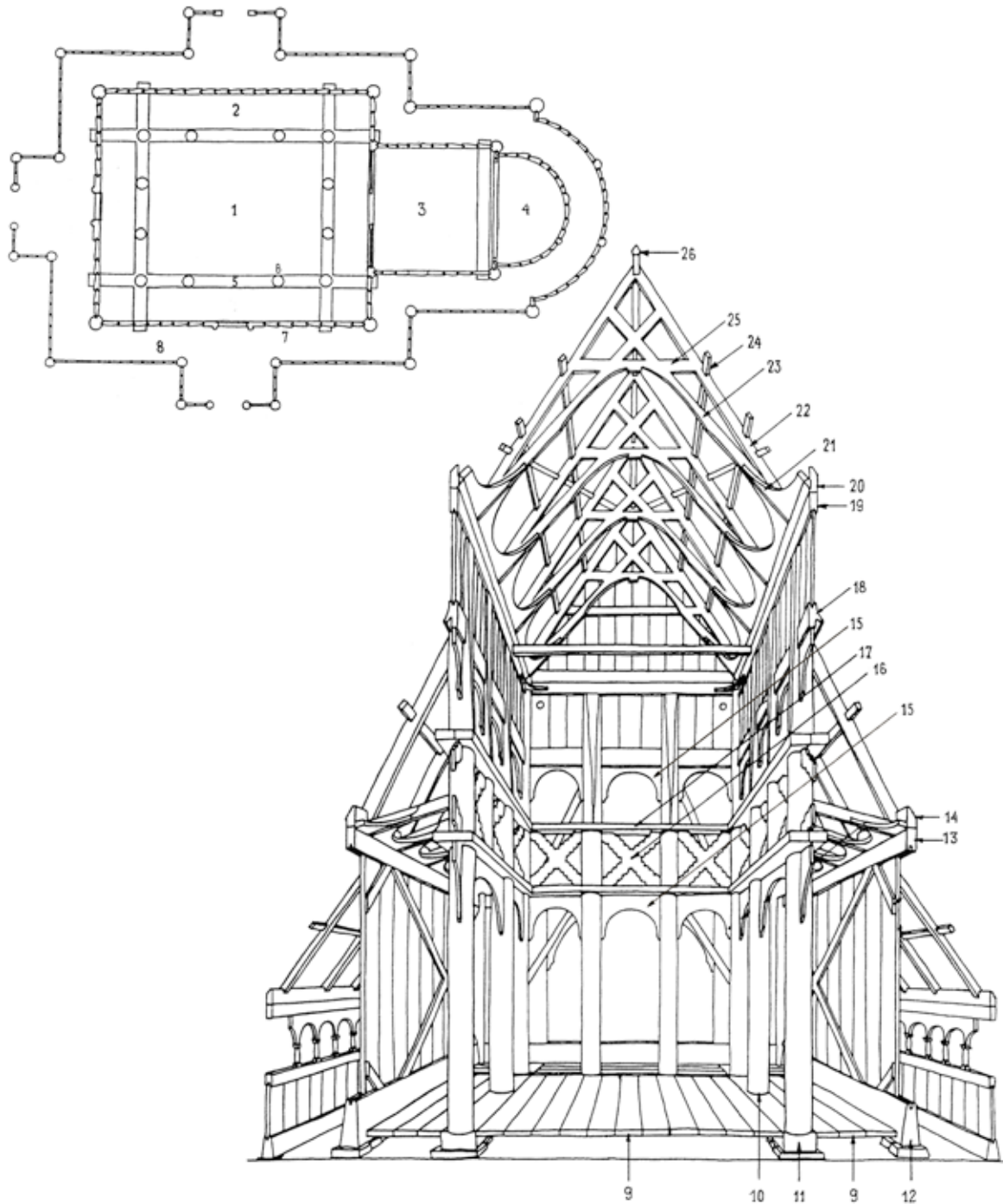
- Urnes, Hopperstad, Kaupanger and Borgund, all in Sogn
- Heddal in Telemark
- Torpo and Gol in Hallingdal; the stave church from Gol is now located at the Norwegian Museum of Cultural History in Oslo;
- Høre, Hegge and Lomen in Valdres
- Lom and Ringebu in Gudbrandsdalen
- Flesberg stave church in Numedal, which originally had a raised nave, but was also greatly enlarged and rebuilt in 1735, when all the inner posts were removed



Church with central mast, for example Uvdal stave church. 1) nave, 2) chancel, 3) apse, 4) corner post, 5) wall planks, 6) central mast, 7) raft beam, 8) sill beam, 9) rafter; 10) tie beam. Based on a drawing by Håkon Christie.

There are also some individual stave churches that have structural characteristics which do not fit into these categories:

- Reinli stave church in Valdres, which in principle has much in common with the centre post churches, but where the central post is carried on the raft beam which supports the roof.
- Røldal stave church, which has a unique construction consisting of several intermediate posts in the walls, but shares no other common traits with the “Møre type”
- Grip, which is generally considered to belong to the “Møre type” but lacks the characteristic external support posts
- Vang and Øye, both from Valdres, which have four free-standing posts, but none are elevated. Both churches were rebuilt before they were taken apart and later re-erected. The two churches’ construction history and original building construction have not been fully clarified.



Church with interior posts, for example Borgund stave church. 1) nave, 2) aisle, 3) chancel, 4) apse, 5) raft beam, 6) nave post, 7) wall planks, 8) pentice, 9) floor; 10) post, 11) raft beam, 12) aisle sill beam, 13) lower aisle wall plate, 14) upper aisle wall plate, 15) quadrant bracket, 16) cross brace, 17) string beam, 18) nave bressummer, 19) lower nave wall plate, 20) upper nave wall plate, 21) quadrant bracket, 22) rafter, 23) nave scissor beam, 24) nave purlin, 25) nave collar beam, 26) nave ridge beam.
Based on a drawing by Håkon Christie.

Other forms of stave church may well have existed. One example is Heddal stave church, which has an elevated nave, but the church may have had a centre post in both the chancel and the nave.

Stave church construction and location

Stave churches used to be numerous across much of Europe, as far south as the Alps. During the Middle Ages, wooden churches were replaced by stone ones on the Continent and the British Isles. Churches continued to be built primarily of wood throughout the Middle Ages in Norway, Iceland and parts of Sweden. Here in Norway churches are often still built of wood to this very day. Some 300 stone churches were built within Norway's present borders during the Middle Ages. The other churches must have mainly been of wood. We do not know how many there were. Churches or church sites have been cautiously estimated to number about 1,200 prior to the outbreak of the bubonic plague in 1350. This would mean that in the mid 1300s there were about 1,000 wooden churches in Norway. In addition

to these, some church sites have disappeared, along with numerous private chapels and places of worship. Most of these wooden churches were stave churches in some form or another, as indicated by local laws and church ledgers from after the Reformation. Many notched (notched logs) log churches from the Middle Ages have survived in Sweden. Only a few of these have been found in Norway, and none from before 1350. We do not know what the construction method was, or the number of smaller places of worship which have now disappeared.

Several of the stave churches replaced earlier churches on the same site. The stave churches in Kaupanger and Nes in Hallingdal both had predecessors, while at Urnes there were three earlier churches. One reasonable estimate indicates that the total number of wooden churches built during the Christian period of Norway's Middle Ages could have been about twice the known church sites in ca. 1350, which would be about 2,000 if not more. It is likely that most of these were built using some form of stave construction.

2. A PRESERVATION PLAN FOR THE STAVE CHURCHES IN NORWAY

The Stave Church Preservation Programme 2001–2015

SJUR MEHLUM

The poor condition of the stave churches were the reason why The Norwegian Directorate for Cultural Heritage initiated the Stave Church Preservation Programme in 2001. A systematic general condition assessment had already been carried out. It found that extensive efforts were needed to safeguard almost every church, churchyard walls, fences and bell towers. The main objectives of the Stave Church Preservation Programme were to repair and preserve these buildings for posterity, conserve their decor and works of art and to contribute to scientific documentation and knowledge about them.¹

The Stave Church Preservation Programme included plans for public information, including open construction sites where the public could climb the scaffolding, see exhibitions and films. The programme also financed a project to improve knowledge about the production and use of pine tar. It included dendrochronological studies and analyses as well as registration of the stave church bells. In retrospect it would have been advantageous if there had been sufficient funding to link some of the research and development activities more thoroughly to the preservation efforts.

The repair of the church buildings is the theme of this chapter. Through the Stave Church Preservation Programme, all 28 stave churches were repaired, and on many this involved extensive work. At Undredal, the

whole church was raised 30 cm and given a new foundation. At Rødven, the ridge turret was lifted off and rot damages repaired. At Hedalen and Reinli, extensive slate roofing work was done and the foundations were repaired.

The Stave Church Preservation Programme also included work in the surroundings, outside the churches. A number of bell towers were restored, including the ones at Høre, Lomen and Borgund. Churchyard walls with portals, and retaining walls were also repaired.

I have elected to concentrate on some specific aspects of the work done at the Hopperstad, Borgund, Urnes and Nore stave churches, as well as the bell tower at Borgund.² These provide a good picture of the extent and variety of the work that was done. The examples also provide insight into the principles guiding the programme, and show how different choices were made to meet the needs of the individual churches. Although these examples differ, they share one common trait: all the work can be defined as repair work. The programme's main aim was to repair the existing churches, as they are. There was never a question of restoring them to the way they had been in an earlier period, as had been done for instance at Kaupanger stave church in the 1960s and at Hopperstad and Gol in the 1880s.

One exception here was the roofing work done at Haltdalen Stave Church, where the wood shingles on the roof of the nave were replaced with overlapping wooden boards. The church had previously had this type of roofing.

The work carried out on Eidsborg stave church is another exception. A completely new roof construction was built over the old one. This was necessary in order to save the original medieval roof construction, which is now preserved beneath the new roof.

About the organisation

The Stave Church Preservation Programme is one of several preservation programmes that are placed under the administration of the Directorate for Cultural Heritage's Department for Resources and Development, Section for Conservation and Maintenance. Those working in this section are specialists in practical building preservation, with expertise in wood and masonry constructions. The section's staff also provides information to private owners of listed and protected buildings and facilities. The section acts as an advisor to the Church of Norway, counties, Statsbygg and other custodians of state buildings and properties.

The programme had a project manager with day-to-day responsibility for its implementation. This included everything from initial inspections of a church, through to planning and completion of the work. Discussions had to be held and decisions made before any work could start on a specific church. Items on the agenda usually included repair techniques, methods and choice of materials. These decisions could be made internally in the section together with the Head of Section.³ In other cases, decisions had to be made with the Directorate for Cultural Heritage's Department for Buildings, Monuments and Sites, and its Archaeology Section. This concerned cases where archaeological interventions were necessary, such as at Urnes. Some cases called for decisions to be made with the Department for Buildings, Monuments and Sites' Section for Protection and Development of Buildings and Green Areas. The toughest decisions were where there was a conflict between preservation and repair, such as the bell tower at Borgund and the south-eastern post of Nore stave church. The owners of the churches were in many cases included in discussing choices between conflicting preservation principles.

In addition to the Directorate for Cultural Heritage's own professional expertise, the craftsmen themselves played important roles as advisors. Also craftsmen who were not directly involved in the actual work were brought in when necessary. External consultants also assisted, including geotechnical and structural engineers as well as architects with special competence in building preservation. In many cases the church owners helped organise the work.

A local site manager, often an architect, was given responsibility for overseeing the work at the construction site. The local manager was in this way engaged in the professional discourse and kept records of meetings. Finding local craftsmen and construction managers was also important. A prime concern of the Directorate for Cultural Heritage was to secure a pool of local competence which could take responsibility for the future maintenance of the churches. This would not be possible if a single central group of craftsmen and a single project manager had been given successive responsibility for all the churches and for the entire programme. The craftsmen were usually self-employed, or came from smaller businesses working in cooperation with one another. The most experienced carpenters were given responsibility for supervising work involving more specialised craftsmanship.

A common denominator in the efforts to preserve the stave churches was the absence of definite assessments of what needed to be done before the work actually started. Unseen damage was often discovered in the construction once the job commenced, and building elements were removed or taken apart. An example of this was dry rot which was often found in connection with foundation or roofing work. This could lead to work being halted while new evaluations were being made. In other cases, the dismantling work uncovered undocumented constructions, which meant progress ground to a halt while new surveying, measuring and other documentation tasks were carried out. Such interruptions demanded flexibility, especially among the craftsmen who then had to stop work on the construction site. These craftsmen were not our employees, which meant they risked losing income during such down-time. Local project managers and the owners of the churches also had to be flexible, as such stoppages played havoc with their schedules too. An important concern among the owners was that the work should interfere as little as possible

with tourist visits. In the stave churches still used as places of worship, it was important to prevent the work from interfering with church activities such as services, weddings and funerals.

View of the damage

No general characteristics can be given of the damage found at the churches. None of the stave churches are preserved in their original form; all have been altered to at least some degree over the centuries. After the Reformation in 1537 the churches were used in a new way, windows were made and pews were added. In the 1600s, many of the churches were given ceilings, and some were rebuilt and extended into large cruciform churches, as was the case at Lom and Ringebu. In the second half of the 1800s many churches were restored using medieval designs as models and ceased to be used for worship by local congregations. Some were renovated to satisfy new demands on the church while others were preserved as they were. All these changes have left each church with its own individual design, and with corresponding deficiencies in construction.

The majority of the churches were of a technical condition requiring considerable renovation. Many of them, about 20, proved to have serious structural damage to the load bearing elements, including problems such as settlement and sinkage, shifting foundations and/or rot in sills, ground beams or staves. Several of the churches had rot damages in the wall cladding, roof boards and roofing. Damage was particularly serious at the churches with wood shingled roofs, but improvements were also needed at churches with slate roofs. In addition, churchyard walls, gates and bell towers were also marred by the effects of time and neglect. The damages had multiple causes. Insufficient maintenance had allowed minor problems to develop into severe damages. Some damage was inevitable, the outcome of natural deterioration and use over many centuries. The stave churches have been put to various uses to this day, which is another reason for their disparate states. Some serve as ordinary parish churches; others are located at museums or function as museum churches. The situation was they all had different use and degrees of maintenance, and therefore the condition and state of disrepair for each church varied considerably.

Craftsmanship and the craftsman's role in the Medieval Project

It is interesting that the original materials of the stave churches have proved to be much more durable than those that had been added in later repairs. So wherever possible, attempts were made to use both materials of the same quality and similar work techniques which had been utilised when the churches were built. These principles were developed through an initiative from the Directorate for Cultural Heritage known as the Medieval Project.

The Medieval Project was an initiative that ran from 1991 to 1999. The aim of the project was to restore all the secular wooden buildings in Norway built before 1537. When the project ended, about 230 buildings had been repaired. A key premise of the project was to ensure that all the buildings were renovated using the same techniques and materials with which they had been built originally. The challenge was that much of the knowledge about these techniques had been lost. An almost unbroken tradition of building techniques and choice of materials existed from medieval times until the industrial age. During this period the range of materials and tools may have been limited, but competence in their effective use was common. Knowledge was passed from father to son, and from master to apprentice through the generations, and trades were learned through applying them.

It was vital for such knowledge and understanding to be reclaimed through work on secular medieval buildings. In this way the Medieval Project was much more than a repair project. It became a competence development programme, where knowledge conveyed manually, craftsmanship and craftsmen's skills took centre stage. The main themes were on older working methods with their appurtenant tools, constructions and building techniques, choice of materials and processing of raw materials. This was all vital knowledge in connection with the practical work.

The most important sources of knowledge regarding medieval buildings in Norway are the surviving buildings themselves. Few other sources exist. So in this project the craftsmen took on the role of building archaeologists. Traces left by tools centuries ago were analysed and old tools were copied so that techniques could be perfected. The quality of the original materials was also studied and new materials of equal quality were found when replacements were needed.

Choice of repair methods

The Medieval Project was of decisive importance for the Stave Church Preservation Programme because it enabled the development of methods and techniques while simultaneously training craftsmen. This helped the Stave Church Preservation Programme to be up and running quickly, along defined methodical paths. The great age of the churches was proof enough that the original materials and traditional designs gave them a long life. Repairs that strive to replicate former standards of workmanship and use of materials, give the stave churches the best possibility to remain standing for several centuries to come.

This repair process could be defined as a processual authentic method.⁴ The method is thereby linked to one of the key notions of international discourse regarding the preservation of cultural heritage. The terms *authenticity* (and *authentic*) were introduced without any clear definition in the Venice Charter in 1964.⁵ When the criteria for making selections for UNESCO's World Heritage List were published with their Operation Guidelines in 1997, the following three equally important conditions were presented: "Sites must be of 'outstanding universal value'", sites must meet the '*test of authenticity*' and "sites must be adequately protected: Legal mechanisms and management plans and procedures adequate to ensure long-term protection must be in place".⁶

In this context, one criteria is key – "the test of authenticity". The Operation Guidelines state that in order for a cultural monument to be listed it must "meet the test of *authenticity* in design, material, workmanship or setting" (my italics).⁷ We should point out here that workmanship in this context is linked to historical craft techniques and marks. It is important to stress that "design", "material", "workmanship" and "setting", are qualities that a cultural heritage object can *contain*. There are plenty of issues connected with the concepts of *authentic/authenticity* and how these are used in literature concerning the preservation of buildings.⁸ In this context I will limit myself to questioning the concept of a *processual authentic method*, as it describes an activity rather than the characteristics of an object. Can a process really be authentic?

The goal of the Stave Church Preservation Programme was to repair the buildings as they are today, with as little replacement of materials as possible. Choices regarding

techniques and materials were guided by the original materials and techniques. This was primarily based on practical reasons rather than ideological concerns. The work faithfully utilised original techniques and materials in order to ensure longevity rather than to meet the ideal of "processual authenticity". However, this does not mean that these concepts cannot be useful as tools for analysing a repaired church.

The Stave Church Preservation Programme differed from the Medieval Project in one crucial way. The latter was an educational programme in which younger, inexperienced craftsmen were systematically trained through attending courses. Those working on the stave churches were also involved in training and in exchanging experiences and findings. Craftsmen were in direct contact with one another and exchanged views on how various tasks could be solved, as well as on the use of tools, techniques and choice of materials.

In many cases these discussions were decisive for optimal results. When the programme started, many of the craftsmen who had worked on the Medieval Project were involved, but as time passed new craftsmen were recruited. These were competent workmen, but they often lacked experience with wooden buildings from the Middle Ages. Those who had such experience, sometimes acted as supervisors, often by working together with others on a church. In this way, recruits were trained without establishing dedicated training courses.

The Stave Church Preservation Programme gave craftsmen central roles in all phases of the work. They were responsible for all the detailed condition assessments and charted the degrees and causes of the damage. In many cases the craftsmen were directly involved in the selection of materials for the individual projects. For instance, they went into the forest to search for the right timber and managed the entire production process of felling the trees, storing them and preparing the material. This ensured that the right quality of wood was used and that it was treated correctly. The craftsmen based their choice of materials on their findings of what had been used in the stave churches they were working on.

The craftsmen devised plans for the specific repair work in close collaboration with the Directorate for Cultural Heritage. As mentioned, all the plans were discussed and approved by the Section for Conservation and Maintenance, or in expanded fora at the Directorate

for Cultural Heritage, depending on what needed to be done. The plans were often of a general nature because, as mentioned, it was seldom possible to estimate the scope of the work required until after the practical work was underway. For example, in connection with the replacement of roof shingles the plans might simply stipulate replacement of “poor shingles”.

It is impossible to give an exact description of how bad a shingle should be for it to be replaced. Nor was it possible to say how many needed replacing until a construction site was established and the scaffolding erected. In cases such as these, the decisions were made at the worksite after the project manager and the craftsmen had discussed the problems they encountered and agreed on how they should proceed. The project manager initially paid frequent visits to assess the work until a consensus could be reached about the standard and scope of the repairs. Once the project was up and running, the craftsmen made the decisions. To put it simply, each and every shingle was not a topic of discussion.

The foundation walls illustrate another example. Plans for restoring these walls were not drawn to a scale that would require the masons to place each stone according to a detailed plan. Instead, a test section of wall was built and evaluated *in situ* and it formed the basis for the final version.

All the decisions, whether made by the craftsmen themselves or in dialogue with the project managers, have been in keeping with the overall plans approved by the Directorate for Cultural Heritage. This form of cooperation was used throughout the programme and was an essential factor in the project implementation. The project manager had to rely on skilled and capable craftsmen who could make their own decisions in specific circumstances. The project manager also encouraged this independence.

The Stave Church Preservation Programme extended the role of craftsmen, making greater use of their knowledge and experience. Traditionally, studies of older building traditions have been limited to academics, such as architects, ethnologists and art historians, and stave church research has been monopolized by these academic disciplines. In the Stave Church Preservation Programme, the investigations made by craftsmen led to new and interesting observations. At Nore Stave Church the craftsmen investigated various types of tool marks left on the original medieval material which, combined

with practical experiments, indicated that the church was built from relatively fresh wood. Drying cracks had appeared in the wood after the church was erected.⁹ Such analysis of the material is a new and rarely used method in the study of the stave churches, and it is an example of how craftsmen, with their competence and approach, can take our knowledge about stave churches and their construction a step further.

In the following, I will provide some examples of work done during the course of the Stave Church Preservation Programme.

Repairs to the roof of Borgund stave church

Borgund stave church is dated to the 1180s, and is among the best preserved stave churches.¹⁰ It is now owned by the Society for Preservation of Ancient Norwegian Monuments. The shingle roof at Borgund, together with its pentices, carved dragon heads and tower, are what characterises the church.¹¹ It is remarkable that the turret with its wood carvings is preserved, and the tarred horizontally overlapping board roof, which was the original outer roof, is still intact beneath the current shingles. Exactly when the church was shingled is unclear. The architect Kristian Bjercknes thought this was done soon after it was built.¹² Today's shingle roof demonstrates that damaged shingles have periodically been replaced over the centuries, either individually or in smaller sections. It is therefore not possible to determine with certainty which are the oldest shingles, but more than likely certain shingles have never been replaced.¹³

The shingles varied in size and in condition and most of them had been hewn with an axe. Only in a few smaller sections, replaced shingles had been sawn; a production method not common until the second half of the 1800s.

It became clear that several thousand shingles would have to be replaced in order to repair the roof properly. However, the shingled roof is such a central feature of the stave church that its appearance would change drastically if all the shingles were replaced. It would be extremely difficult, if not impossible, to fashion new shingles that would recreate the impression created by several hundred years' of weathering and minor repairs. So a decision was made to create some test sections



Borgund stave church, viewed from the south-east. Photo: Jiri Havran, undated.

where only the damaged shingles would be replaced. This was an approach that challenged the skills of the carpenters.

The decision had to be made whether to make the new shingles with an axe or with a saw. Sawn shingles can be shaped with greater precision than hewn ones, and roof surfaces composed of sawn shingles have a far more clean-cut and uniform look. However, given that large parts of the old roof were made from hewn shingles, the decision was made to use this method of production.

Several test areas were made on the roof, using a variety of working methods. Working in cooperation, a suitable method was found which ensured the preservation of the still usable shingles, while accommodating the new ones in a balance between preservation and renovation. It is of utmost importance that the roof has to remain waterproof for a long time, and this eliminates

approaches that are too doctrinal about retaining the old shingles. The shingles lie directly on the roof boards without any form of waterproofing, and if water works its way beneath them, the supporting roof constructions below would be at risk.

After making some test areas, the Directorate for Cultural Heritage concluded that a method involving simple replacement with hewn shingles would be suitable for the entire church. Before this assignment could commence, however, it was important to find the right material.

The Medieval Project had highlighted the need for the right choice of materials.¹⁴ The best preserved shingles on the church were of straight, densely grown heartwood pine. Analyses of the shingles revealed an extreme density which is hard to find in present-day Norwegian forests. The carpenters began an extensive

search for suitable timber. Shingles formed with an axe require exceptional wood, from trees that grow straight and are dense. No trees in the immediate area met the requirement, so the search had to be extended.

Eventually, enough suitable material was found, and the production of shingles could begin. Part of the preparations involved determining what sort of scaffolding should be erected. A large scaffold was decided upon, wrapped with tarpaulins around the entire building (see photograph on next page). This scaffolding covered two needs: it gave the craftsmen safe and good working conditions as well as allowing the Society for the Preservation of Ancient Norwegian Monuments, who owns the church, to guide the tourists around the scaffolding to see the work being done. (The same solution was chosen when the shingles at Gol stave church were replaced a few years later.) The scaffolding at Borgund also provided an opportunity to carry out a thorough 3D scan of the turret.¹⁵

As the work began, the carpenters used the test sections as a reference for how the work should be done, how to determine which shingles could be preserved and how the new ones should be fitted.¹⁶ The test sections also provided a good indication of how many shingles needed replacing. This turned out to be a very efficient way of working. Most of the decisions about how to do the work were made in connection with the test sections. In this way, the costly scaffolding could be optimally utilised without stopping work to wait for the production of shingles, or for necessary decisions from the project management. After several months of work the shingled roof was treated with pine tar. In total, about 8,000 of about 18,000 shingles were replaced. No more were replaced than absolutely necessary, as it was important to maintain the character of the church roof with variations of shingle size, form and surface.

Repairing the roof of Hopperstad stave church

Hopperstad stave church dates from the 1130s and functioned as a parish church until 1877, when it was sold to the Society for Preservation of Ancient Norwegian Monuments. The purchase only included the medieval part of the church. The post-Reformation additions and furnishings were demolished and the materials were sold. Then, in 1885, the architect Peter



Test area for replacing roof shingles on the southern pentice.
Photo: Sjur Mehlum 2010.



Replacing roof shingles; each shingle was fitted individually. Usable shingles were kept. There is no cardboard, foil or other waterproofing beneath the shingles. Photo: Harald Ibenholt 2009.



Borgund stave church covered in scaffolding, viewed from the south-east. Photo: Hans Marumrud 2011.



Axel Andersen hewing new shingles at Borgund. The photo was taken on the scaffolding. Photo: Sjur Mehlum 2011.

Andreas Blix (1831–1901) was given the task of restoring the stripped-down church back to its medieval configuration. His point of departure was partly based on the evidence he found in the existing church, but was also modelled on other stave churches, especially Borgund.

Like Borgund, the church was given a turret, dragon heads, pentices, and not least a shingled roof. The shingles were of sawn pine, all the same size and laid in precise rows. No documentation has been found explaining why Blix refrained from using hewn shingles. That would have made the church even more like Borgund. However, the deciding factor was probably that sawn shingles were both faster and cheaper to produce. (Sawn shingles were also used in the 1880s when Gol stave church was rebuilt in a restored form at the Folk Museum in Oslo)

When the craftsmen of the Stave Church Preservation Programme made their initial investigations at Hopperstad, they discovered that many of the shingles were split or had been damaged by rot and the roof needed considerable repairs. Some minor repairs had previously been done on parts of the roof, but as inferior materials had been used, and the skills on how to lay the shingles had been lacking, the newer shingles were in many cases in worse shape than the ones from 1885.

The initial plan was to replace individual areas of the roof where this was deemed absolutely necessary. However, a large tree kept areas of the roof damp and shaded, especially on the north side of the church and meant that a blanket of moss and lichen grew on the roof. As at Borgund, a choice had to be made regarding the use of hewn or sawn shingles. Sawn ones were chosen as these were an important part of the church's architecture. Sawn shingles of good quality, made properly, have a very acceptable lifespan of about 100 years. At both Borgund and Hopperstad it was important to retain distinctive visual appearances. So, hewn shingles were selected at Borgund and sawn ones at Hopperstad. This was the main idea when it was decided to replace all the shingles at Hopperstad, whereas at Borgund only the damaged shingles were replaced.

The work had to be planned long before it could start, and as was the case at Borgund, considerable time was spent finding the right quality of pine wood and producing the shingles. Because of this, the work took two seasons. Laying shingles is much less complicated when all of them are replaced simultaneously. The shingles are then put in place row by row, as had been done in the 1880s. The new shingles copied the materials, design and laying pattern used before. To complete the job, the shingles were treated with pine tar. A total of 19,000



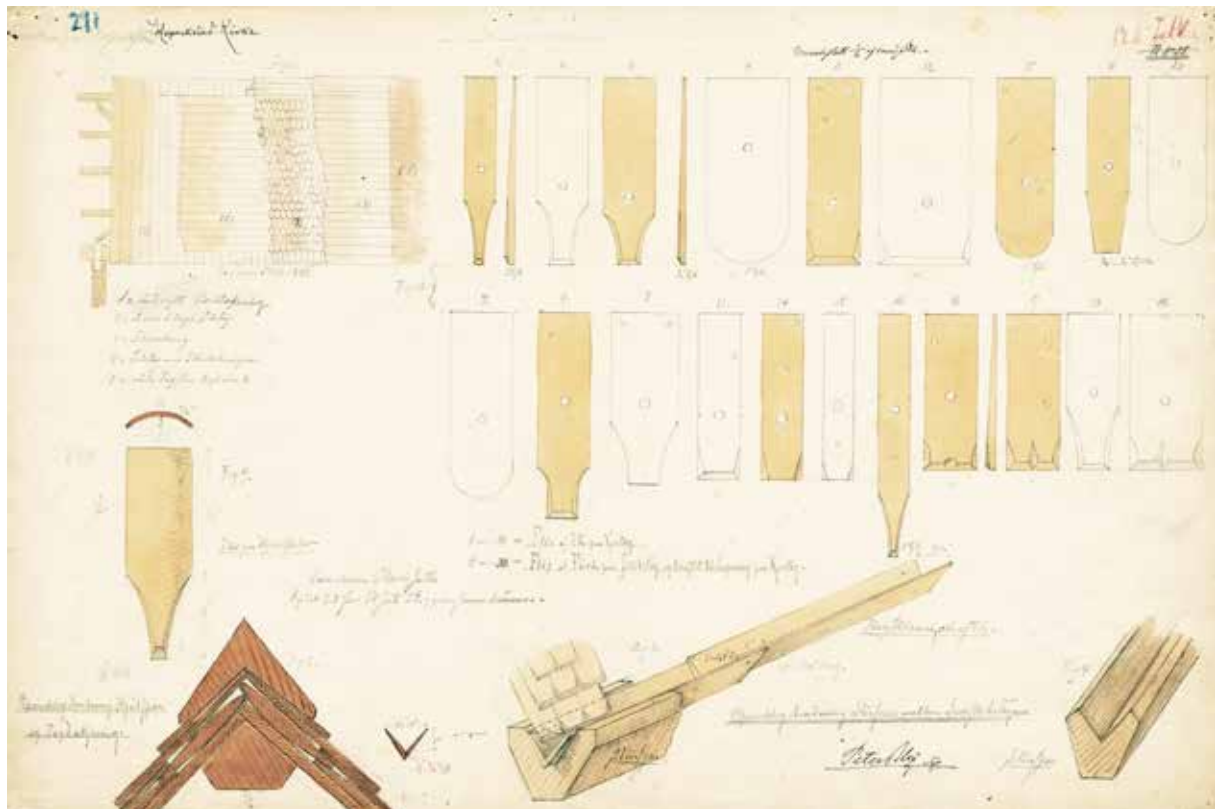
Hopperstad stave church, the roof was covered with sawn shingles during the restoration in the 1880s. Viewed from the south-west. Photo: Marcin Kaliński 2011.

shingles were used. Although all of these are new, the preservation of the church roof has been secured.

The work on the roofs of Borgund and Hopperstad can both be characterised as repairs. The primary objective was to make necessary repairs to prevent leakage and subsequent rot, which can cause damage over time before they are discovered. However, the two distinct ways of repairing the roofs were motivated by visual and historical reasons.

Urnes stave church, stabilisation and new foundations

Urnes stave church is the only Norwegian stave church on the World Heritage List, and was inscribed in 1979. It was built in the 1130s, and is thought to be the oldest stave church in Norway. Other churches had existed on the site earlier, and archaeological excavations beneath the current church revealed post holes from these earlier churches.¹⁷ Research has also shown that construction elements in the current church incorporate parts of the previous church, including the Urnes portal and the carved planks on its north wall.¹⁸



Architect Peter A. Blix's building survey documentation at Hopperstad before the restoration. The drawing shows the composition of the roof with different kinds of shingles. Oak shingles were used on the chancel roof, pine was used elsewhere.



Hopperstad stave church was restored during the 1880s, and the photo shows the final result. Photo: unknown, undated.



Replacing roof shingles at Hopperstad. Unlike Borgund, here the shingles were changed in whole areas. There is no cardboard, foil or other waterproofing beneath the shingles here either. Photo: Nedre Jølster bilelag, undated.



Urnes stave church viewed from the north. Photo: Birger Lindstad 1995.

The Urnes portal occupies a central position in Norwegian church and architectural history. It has been measured and copied a number of times and is one of Norway's most important art objects. Urnes has, like other stave churches, gone through many changes in its lifetime. Over a long period of time, it suffered stability problems, with subsidence on its north side. Poor drainage was thought to be the cause. In the 1980s new drainage was installed but this did not solve the problem.

As part of the Stave Church Preservation Programme, comprehensive analyses were made of the ground around the church. The water table was investigated, and drainage conditions in the soil assessed. The soil's stability and prospective frost heave problems

were also considered. The reports indicated that the movement in the ground could be traced to a combination of soil sinkage and surface water, frost heave and poor foundations.¹⁹ But this provided no definitive explanation.

Measurements were also taken inside the church, and it was found that the northern raft beam was 12 cm lower than the southern one. This had influenced the church's loadbearing system. Loads that were originally supported by the northern row of staves were now weighing down on the wall planks of the north wall and the roof of the aisle. For this reason, the wall planks and the Urnes portal were under compression, and the aisle sill beam was carrying an uneven load which twisted it out of position.



Elevation showing cross-section of the nave at Urnes stave church from the east. Subsidence on the church's north side is indicated by a red arrow. Drawing by Einar Oscar Schou. Undated.



New foundations under the raft beams, work done during the Stave Church Preservation Programme. Photo: Marit Westli Arntzen 2009.

Several expert craftsmen concluded that this uneven load could make the aisle sill beam break.²⁰ The sill beam was also lying too low, lacking necessary clearance above the ground, so there was a danger that rot could develop and spread. Numerous cracks and slippages were also found in other parts of the church construction.

Not all of these observed examples of damage were linked to the subsidence on the north side of the church. For several hundred years Urnes stave church had stability problems caused by the rebuilding of the interior, which had entailed cutting two staves. So it was important to determine whether the sinkage of 12 cm was relatively recent, or if it had been this way for a long time.²¹ Additional investigations were carried out beneath the church, and it was found that the foundations were inadequate. Investigations of the accessible areas



Unsteady, incomplete foundations under the raft beams, put in place around 1970. Photo: Ina Borgen Snarud 2008.

beneath the church floor showed that the foundation supports were few and of poor quality. This included not only the raft beams in the nave, but in all the areas that could be investigated. It became clear that the only way to get a complete view of the situation was to remove the church floor.

This was a demanding process, as firstly the whole interior of the church had to be taken apart. The elements of the interior and the floor were marked, dismantled and stored in containers outside the church.²² This gave a complete view of the situation. The conclusion was that a weak foundation was the main cause of the more recent subsidence damage, and the serious situation on the north wall in particular.²³ The foundation consisted simply of pillars of rocks, and the rocks themselves were not suitable for this purpose. Nor were there any stone plinths on the ground which could distribute the weight.

The reason why the foundations were in this state was also investigated. Extensive archaeological excavations under the church had been carried out in the late 1950s.²⁴ They are well documented, but we do not know much about the state of the foundations *before* the excavations. In 1970–71, fresh archaeological studies were conducted, and a new support system was subsequently installed beneath the nave. The system involved placing a new tier of joists beneath the raft beams. These rested on a foundation of stacked rock pillars, as to avoid damage, such as scrapes, which might be caused



Rot-damaged sill beam on the north wall of the nave. The foundations were repaired, but not the rotten material, as it is not load-bearing. Photo, Sjur Mehlum 2009.



New foundations under the sill beam on the north wall. The sill has been raised by about 10 cm with good clearance from the ground. This will help prevent further rot damage. Photo: Leif Anker 2013.

by direct contact between the raft beams and the rock.²⁵ This solution would also help make future investigations easier.

A decision was made to strengthen the foundation beneath the church even before the floor was removed, but a complete assessment of the situation was only possible once the floorboards had been removed. The conclusion was that the whole foundation and stone walls beneath the church had to be rebuilt.

The difficult question was whether an attempt should be made to jack up the church to reduce the load on the north aisle wall with the Urnes portal, or secure the church as it was. In the latter case, the church would be given a new, stable foundation but it would retain its subsidence. This would not improve the situation for the aisle wall with the Urnes portal and the sill beam, but neither would it exacerbate it in the short-term. The alternative would be to raise the north raft beam by 12 cm. A number of craftsmen concluded that raising the church was the best solution, but the main objection was that no guarantee could be made against slippage and warpage reoccurring, and the process of jacking up the building might cause new damage.

After numerous inspections and evaluations, the Directorate for Cultural Heritage opted to jack up the church. Meticulous planning contributed to a highly successful operation. The stone foundations below the

raft beams and stone supports beneath the aisle walls were dismantled, and masons rebuilt them under the entire church. The job required the use of 50 cubic metres of stone.²⁶ Very precise stonework was needed to stabilise the new foundations. The masons opted to use dry stone masonry, meaning the work was done without the use of mortar and large stone plinths were placed at the base of the foundations. Once this was done, the floor was reassembled. The floorboards were now placed on joists which ran between the raft beams, as it was originally. In other words, the secondary tier of joists from 1971 beneath the raft beams was left out. Then the interior was reconstructed.

In connection with the lifting of the church, the wall beam on the northern aisle wall was lifted out of the ground, and an evaluation was made whether the damage caused by rot should be repaired by splicing in new wood.

However, as the rot was only of visual importance, rather than structural, these areas were not spliced. This decision and approach had an impact on decisions regarding other, older rot damage in the church. Extensive damage in the original material at Urnes was evident, for instance in the raft beams, but this was rarely repaired or treated in any way. Such repairs would involve interfering with the original medieval material, of which the Directorate for Cultural Heritage is highly restrictive.



Nore stave church viewed from the south-east. Photo: Marcin Kaliński 2011.

Even in the initial investigations it became clear that such damage was not the reason for the major subsidence problems. So there was no reason to address these problems for structural or technical stability reasons. Nor was there any danger of the rot spreading as long as the wood was kept dry.

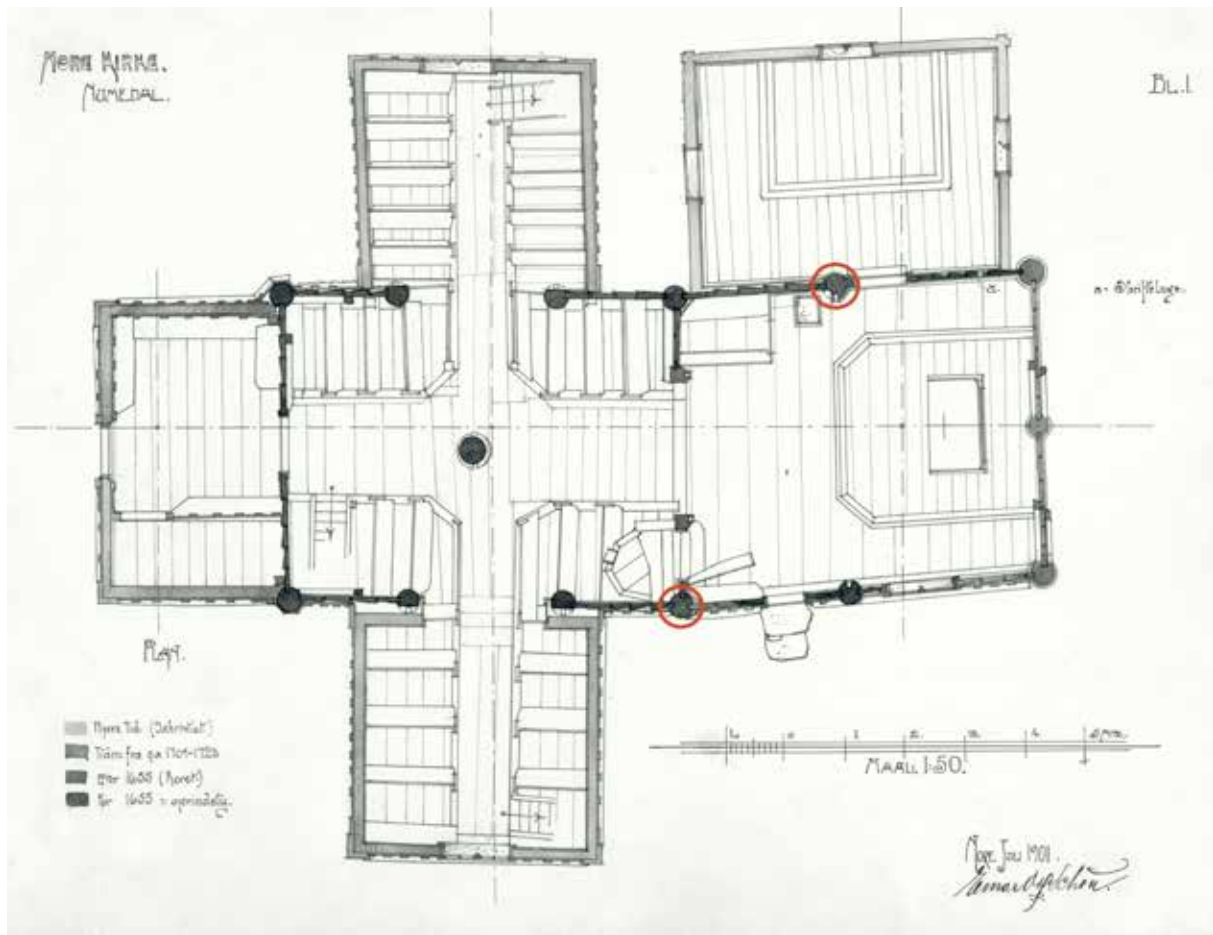
Urnes stave church was a construction site for 2½ years, and it was not possible to allow tourists to enter. For this reason, the Stave Church Preservation Programme financed the establishment of a temporary visitors centre by the church to inform the public about its history.

Work on Nore stave church

Nore stave church has been extended many times and its construction history is not yet fully known. According to dendrochronological tests, the timber in the oldest part of the church came from a tree felled in the winter of 1166/1167.²⁷ The chancel was extended in 1683, and the current transepts were built in the early 1700s. Over the centuries, Nore stave church has suffered serious rot damage with accompanying crushing and settlement damage. There was also damage to the original loadbearing construction, such as sill beams, corner posts and wall plates. The damage was so bad that the construction had lost much of its supportive and bracing function, and the original construction configuration was destroyed.



Nore Stave Church. South-east corner post of the nave has extensive rot damage along the whole length of the post. It was also repaired in 1969. Photo: Arne Madsen 1969.



Ground plan of Nore stave church. The damaged staves are marked with a red circle. Drawing by Einar Oscar Schou, 1901.

Other construction elements, such as wall planks, exterior panelling, the floor and later additions, had held everything in place.

Both the south-eastern corner post in the nave, and the northern intermediate post in the chancel, had suffered considerable damage caused by rot, and both posts had lost much of their loadbearing ability. The south-eastern corner post in the nave had been repaired in 1969 using a new post which was attached to the rotten one with metal bands. However, this proved largely unsuccessful. Any attempt to re-establish the building's original supportive and bracing system, would mean that the posts would have to be replaced, and the new ones would have to be connected with the sill beam at the bottom, and with the wall plate at the top. The

problem with this solution was that it would affect the church interior.

Nore stave church's interior is one of the most richly decorated of all the stave churches, and nearly all its interior surfaces are decorated. The distemper paintings date from 1250 to 1850, with the dominant decor dating from the 17th and 18th centuries. The two damaged posts are part of the decorated interior, and so their removal would depreciate this. The decor on these posts and the adjoining wall planks was in good condition.

After thorough deliberation it was decided that the decorated interior, and the preservation of original medieval material, should take priority over the re-establishment of the stave church's loadbearing construction system.



Intermediate post in the north wall of the chancel, marked with a red arrow. Damaged above the ceiling and under the floor. Photo: Birger Lindstad and Joppe Christensen 1995.



South-east corner post of the nave, marked with a red arrow. Photo: Birger Lindstad and Joppe Christensen 1994.



New, adjusted post for repairing the south-east corner post. The west side of the post is adjusted to the rot damage. This method secured the support of the roof while preserving the interior of the church. Photo: Hans Marumsrud 2003.



Repaired south-eastern corner post. The post was then panelled as it was before repair work commenced. Photo: Hans Marumsrud 2003.



The bell tower at Borgund stave church, viewed from the south-west. Photo: Arve Kjersheim 1997.

There was also great danger that the decor on the wall planks might be damaged if the posts were to be replaced. To enable the north wall and its wall panel to continue to support the weight of the roof, damaged portions of the wall beam were spliced, and work was done to ensure that this area was supported on a solid rock foundation. The south-eastern corner post was upgraded by replacing the post from 1969 with one which fit the remains of the original post better. Now most of the roof weight could be carried by the new post.

This improved the stability situation, but it was not perfect. In Nore stave church, the original medieval material and the later décor were preserved at the expense of the church's construction system.²⁸ This solution contrasts with the solutions chosen for the bell tower at Borgund.

The Borgund bell tower

The bell tower at Borgund was included in the Stave Church Preservation Programme, and is the only structure of its kind remaining from the Middle Ages. It has a stave construction very similar to that found in the stave churches, and is an essential element of the cultural environment at Borgund.

Large parts of the bell tower are medieval but newer elements were added in the 1600s, 1800s and the 1900s. Technical investigations, instigated and led by the Stave Church Preservation Programme, showed the tower to be in extremely bad condition. Only the section above the bell room was found to be in an acceptable state, the other parts of the bell tower were severely damaged. The posts were full of rot, to the extent that many were completely hollow. The rafters and beams had mostly



Rotten post from the bell tower: The lighter areas show healthy wood. Photo: Ellen Devold 2005.



Making a new post. From the left, Erlend Gjelsvik and Stig Nordrumshaugen. Photo: Ellen Devold 2005.

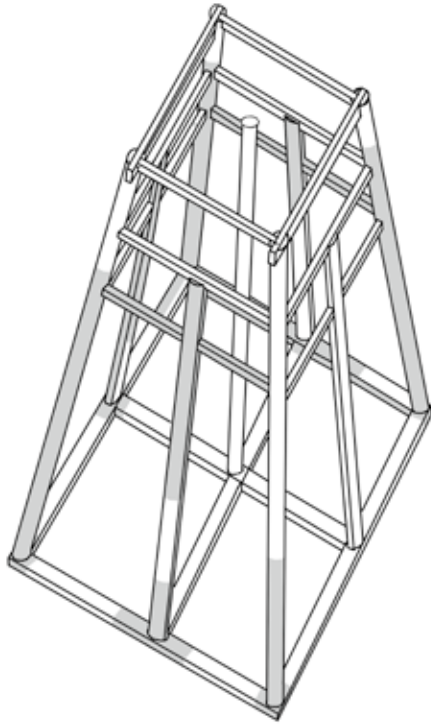
rotted and joints and structural connections had also been destroyed by rot. The deterioration would increase if nothing was done.

Several solutions were discussed. First, the damaged load-bearing constructions could be reinforced, with either wood or steel. A new construction could be erected inside or outside the existing one, enabling the damaged bell tower to be suspended. As the damage was extensive, such a construction would necessarily dominate, and there was no obvious way of connecting the old and new constructions. The solution would also involve changes to the bell tower to protect the rotted material from water. All in all, this would have led to radical changes to the bell tower.

Another solution which would result in an almost completely preserved bell tower, would be to move the original indoors at a museum and replace it with a copy on site. The bell tower would then be preserved, but merely as a museum object. This option was discarded, largely because it would contradict against a major principle for the preservation of listed monuments: cultural monuments should preferably be preserved *in situ*. The cultural environment at Borgund would depreciate if the bell tower were moved, even if a copy were built on the same spot.²⁹

The solution chosen was to repair the bell tower by replacing the rotten material. This was a major task, so it was decided that the entire bell tower had to be dismantled. The upper section of the bell tower was first lowered down and then the post construction was taken apart piece by piece. Everything was transported to a workshop where the repairs were carried out. An advantage of dismantling the bell tower was that the individual construction elements could now be examined thoroughly by the craftsmen who studied and documented the joints, dowels, slits and old tool marks.

These studies provided a firm basis for the task of copying the parts which needed replacement. As the sketch shows, large portions of the original material had to be replaced, and no full assessment of this could be made until all the parts had been examined. As with the stave churches, great emphasis was placed on finding material that matched the original in quality, and wherever possible, on using the same types of tools. The visible elements were not all that had to be copied. Numerous types of dowels and other hidden joints had



The stave construction of the bell tower: Rot damage is marked in grey. Isometric perspective, after a drawing by the architect Heidi-Kathrin Osland, undated.



The bell tower viewed from the east, after the repairs to the load-bearing structure had been completed, and before it was panelled. Photo: Ellen Devold 2006.

to be made, down to the last detail. In the case of the bell tower, it was vital for all the structural elements to be replaced in order to restore the stave construction's loadbearing and bracing functions.³⁰

Principles and solutions

Medieval cultural heritage represent some of the most important sources of knowledge about the period. This has been acknowledged since the mid-1800s when the Society for Preservation of Ancient Norwegian Monuments was established.³¹ Scientific research's need for medieval source material was an impetus when an Act was passed in 1905 (*Lov om Fredning og Bevaring af*

Fortidslevninger) (*Law for the Listing and Protection of Cultural Heritage Remains*) protecting all buildings and all other non-movable elements dating from the Middle Ages or earlier.³²

This principle was clearly incorporated in the Cultural Heritage Act, which stipulates that monuments and sites from medieval times, defined as earlier than 1537, are automatically protected.

The material from the Middle Ages is invaluable for the study of the stave churches, as there are hardly any other sources for the church's original design. The Stave Church Preservation Programme has therefore adopted this prohibitive stance on the disturbance of medieval material.



Borgund stave church and bell tower, after the work had been completed. Both the church and the bell tower are treated with pine tar. Photo: Dagfinn Rasmussen 2015.

The bell tower at Borgund is an exception. Here, extensive replacements were made to the medieval stave construction so the bell tower could be preserved in situ. The source value of the renovated parts was ensured by meticulously documenting and storing the material.

A main principle of the Stave Church Preservation Programme has been the repair of the existing churches as they are. The policy has excluded the notion of returning or restoring the buildings to one of their earlier forms or designs. This principle of repairing the existing building is now well-established in the Norwegian cultural heritage administration. It ensures that as much of a building as possible is preserved, while adding as

little as possible. In addition to being an accepted and well established principle, it was decisive in enabling the Stave Church Preservation Programme to be completed within 15 years.

Alternatively, if the principle selected had been to return one or more stave churches to earlier versions, a number of difficult and to some degree impossible choices would have had to be made. It would have been particularly hard to choose which period in the church's history to revert to. The implementation of such alterations would also have demanded much more knowledge than we have today about the stave churches and their history. The Stave Church Preservation Programme

would have been something very different and much more comprehensive.

The churches have, with few exceptions, only rarely been approached according to the principle that it is their *current* designs, as they were handed down to us, which should be preserved.

Traces of changes made in earlier times

It is impossible to give a general description of how the 28 surviving churches have been treated in the past 150 years. Our knowledge about them is not detailed enough, and the churches have of course been dealt with in different ways.³³ In the 1880s, Hopperstad stave church was reverted back to its medieval configuration, and in the 1960s, Kaupanger stave church was returned to the design it had in the 1600s. In the 1880s, Gol stave church was moved to a museum and restored there. However, other stave churches, such as Urnes, Uvdal and Lomen, have been treated far more gently. Some stave churches, such as Høyjord and Flesberg, have been almost overlooked.³⁴

The importance of craftsmanship and materials

The Directorate for Cultural Heritage's clear emphasis on the importance of craftsmanship and material quality, and especially the key roles given to craftsmen, is something new in the management of the stave churches. Whereas craftsmen previously were told what to do, they were now included in necessary investigations and queries. They provided essential advice and evaluations when specific issues were discussed and included when principles were debated. In order to continue developing the work on cultural heritage properties in Norway, everyone involved with this work continue to progress. The craftsmen who master traditional skills must maintain their strong position at the vanguard of these efforts. In this way, the cooperation between management and workmanship can increase the levels of knowledge in the years ahead.

Through the Stave Church Preservation Programme, the Directorate for Cultural Heritage has systematically repaired one building after another. Never before has such an extensive initiative been implemented to restore the stave churches. Two consecutive project managers

were involved, but the Head of Section has been the same throughout. This has ensured strong continuity, making it easy to convey experiences from one stave church to the next.

The right professionals at the right place and right time

Sufficient time and resources were vital for the completion of the Stave Church Preservation Programme. It was crucial that the financial authorities gave priority to the implementation. The assurance that funding would be available throughout the 15 years enabled the Directorate for Cultural Heritage to carry out the work in a way that ensured professional quality. All the parties involved were given sufficient time to plan and carry out their tasks. The repair work demanded cooperation between church owners, building consultants, local project managers, craftsmen and suppliers of materials. As has been shown, considerable time could pass between the planning stages and the implementation of the actual repair work.

The opportunity to plan for several years ahead was also of prime importance for documenting the church buildings and conserving the church art. In most cases this established a link between building documentation and the rest of the work, as was the case with the bell tower at Borgund. The conservation of church art and the repair work on the church buildings also had to be scheduled in a sensible order. For example, the cleaning and other work on the interior decor had to be done *after* the construction work was completed. One of main tasks for the project manager was to ensure that the right professionals made it to the right place at the right time.

Together with the Viking ships, the stave churches are Norway's most important contribution to tangible world cultural heritage. Even though the Stave Church Preservation Programme has now been completed, we will have to continue working on the churches in the future. The programme revealed that much damage can be traced to a lack of maintenance. This means it is essential for the Directorate for Cultural Heritage, and the owners of the churches, to collaborate on proper maintenance routines for the individual buildings. However, maintenance is not the only solution. All the churches will one day again require extensive works,

such as new roofing. Stringent control routines which thoroughly assess the condition of the churches have to be maintained. This will help in predicting when such larger jobs are necessary. These can then be planned and implemented in a comprehensive way.

On-going maintenance and well-planned implementation, undertaken by skilled professionals, are of paramount importance for the future preservation of Norway's 28 stave churches.

3. THE COLOURFUL CHURCH INTERIOR

Preserving the art and furnishings of the stave churches

MILLE STEIN and IVER SCHONHOWD

One of the aims of the Norwegian Directorate for Cultural Heritage's Stave Church Preservation Programme was to conserve the art and furnishings inside the churches. This entailed compiling an overview of the contents of all the stave churches, to assess the condition of the interiors, estimate costs of necessary preservation and then get this vital work done. The following will show how an inventory and register of the condition of objects were made, and the priorities that were used to select the objects that most needed treatment. We will also discuss conservation strategies and provide examples of newly-acquired knowledge about the decoration of the stave churches.

Firstly, what formal status does art and furnishings in stave churches have, and why is this material so important that about a quarter of the preservation plan's budget was earmarked this area? The stave churches are automatically protected, and have both national and international significance because of the unique way in which they were built. The church interiors, with their decoration, are an integral and vital part of our cultural heritage:

The church building and its decoration are inherently a source of faith for generation after generation, while being of great importance as a frame of reference for Christian beliefs, church activities and as a source of experience. Another main consideration is that the churches and their furnishings provide a focus on

essential aspects of centuries of Norwegian history. Churches and churchyards document our ideas and rituals, key aspects of our cultural history, design history, use of materials and handicraft traditions from the Middle Ages to the present.¹

The statutory protection incorporates all immovable inventory such as pulpits, altars, baptismal fonts and wall and ceiling decoration, whatever their age. Moveable objects, such as sculptures, paintings and triptychs, if they date back to the Middle Ages, are also protected.² Moveable objects from after 1537, when the Reformation came to Norway, do not have the same protection. For example, the Norwegian Directorate for Cultural Heritage only has advisory powers when it comes to the preservation of an altarpiece from the 1600s.³ Although some stave church art and furnishings may not be old enough formally to qualify for protection, the Directorate decided to include these on the understanding that they are important cultural history artefacts from the changing history of the stave churches.

Therefore the number of art and cultural history objects for which the Directorate for Cultural Heritage took financial responsibility multiplied. Consequently, the criteria for choosing and prioritising what to treat expanded to include not only the age and condition of an object, but also its artistic and cultural history value, both on a local and a national level.

Condition reports

The objective was to register the condition of church interiors, immovable as well as moveable inventory and works of art; evaluate any measures needing to be taken to preserve this material for continued use in the churches, and estimate the costs of the individual jobs and repairs. The condition report register was to be used by the Directorate for Cultural Heritage as one of several tools for setting priorities in the stave church programme.

Goals and methods

The preservation work triggered by the condition report register was coordinated as much as possible with the repairs to the church itself. In some cases, the objects had to be covered up or removed before work on the building could start. In other cases, it was more expedient to begin the conservation of such furnishings and interiors afterwards. The prime objective was to carry out all the work in a church within a time frame that was as concentrated as possible.

Condition reports were made in 27 of the 28 stave churches in the period 2001–2013.⁴ This work was conducted for the most part by two people: a painting conservator from the Norwegian Institute for Cultural Heritage Research (NIKU) and a conservator from the Directorate for Cultural Heritage. The motive for using the same two experts for the entire registration of interior conditions was to achieve as much consistency in the evaluations as possible. Several painting conservators participated in some of the initial inspections to discuss and establish the registration methods. The objects were appraised with due consideration to their materials, age, size, conservation condition, overall condition, assumed causes of damage and estimates of how long repairs would take.⁵ These observations were then noted on an appropriate standard form or questionnaire. In addition, all the objects were photographed. After the initial registration of condition, summaries were sent to church owners. These reports are available through the archives of the Directorate for Cultural Heritage.

The condition reports on objects contained verbal descriptions as well as numerical values from 0 to 3, where 0 meant that no work was required and 3 indicated the need for prompt treatment.⁶ The numerical values related only to the stability of the materials, independently of whether they were original or secondary.

Where the condition was assessed as 2 or 3, indicating the need for urgent action to save the object, this category was followed with an estimate of how long it would take to consolidate unstable structures. This estimated time frame was based on experience, not tests. When restoration methods were judged to be uncertain or particularly complicated, preliminary projects were recommended. Then, on the basis of examinations and tests, solutions were suggested and estimates of the time the work would take were made.

Physically, the evaluations were made from the floor, or on top of communion tables, an available chair or a ladder or stepladder. Surfaces were assessed with the help of flashlights and headbands equipped with double magnifiers; painted surfaces were tested using a small wooden stick to test the paint's adhesion to underlying layers. The assessment of ceiling decoration was often given with reservations, because of the distance from which it had to be assessed. Sometimes, a ceiling was simply listed with its condition unknown. The registration of the condition of art and furnishings in a single church took from two to six hours, depending on how much needed to be registered and how accessible the furnishings were.

Restoration projects, prioritised according to condition, age and cultural history value, were started on a rolling basis, based on the initial status report.

In the period 2013–2015, the condition of the artwork and furnishings in 26 stave churches was registered once again using the same method.⁷ Potential deterioration was looked for, in both treated and untreated material, enabling the status of this part of the Stave Church Preservation Programme to be evaluated at its conclusion.

Results: types of object and conditions

A condition report was made covering 852 objects and decorated surfaces in 27 stave churches (see table 1). Triptychs and altarpieces were registered in 25 churches, pulpits in 22 and crucifixes in 14. Various forms of wall and ceiling decoration were registered in 21 of the churches, mostly distemper paint decoration. In addition to the above groups, the condition of all of the objects which are generally found in a church, including chasubles, baptismal fonts and altar chalices, was registered.

As the registration of condition reports involved stave churches, medieval art and medieval furnishings were

Table 1. Overview of art and furnishings in the stave churches, sorted according to condition and treatment.

Number of churches with status reports	27	26
	Status report 1 (2001–2013)	Status report 2 (2013–2015)
(No. of registrations)	852	852
No. in category 0 (no treatment necessary)	305	359
No. in category 1 (monitoring needed)	330	354
No. in category 2 (treatment needed)	131	92
No. in category 3 (treatment needed urgently)	81	12
Condition unknown (no category given)	5	35

No. of treated objects	133	133
No. in category 0 (no treatment necessary)	1	74
No. in category 1 (monitoring needed)	6	39
No. in category 2 (treatment needed)	60	18
No. in category 3 (treatment needed urgently)	66	1
Condition unknown (no category given)		1

naturally of special interest. Much of this material had been painted over, in other cases, only fragments have survived. Visible painting from the Middle Ages has often changed colours. More can be said about how the stave churches' decoration looked in the Middle Ages after studying this material with a focus on how it might have looked when completely new. About 10% of the objects (88 of them) are from the Middle Ages (see table 2), and five churches have more or less complete triptychs, seven have crucifixes, two have calvary groups, two have sculptures and seven have wall decoration.⁸ Much of this wall decoration is fragmentary or partly concealed by overlying coats of paint.

When first registered in the period 2001–2013, 131 objects and decorated surfaces were assessed as being in category 2, and 81 as being in category 3. This triggered 133 restoration projects, of which 27 (approximately 30%) were linked to medieval objects.

Restoration or treatment comprised everything from the repair of broken parts of objects to the conservation of large, decorated wall surfaces and pieces of furnishings.

By the time of the second status report, the number of objects in category 2 had been reduced from 131 to 92 and the number of objects in category 3 was reduced from 81 to 12 (see table 1).⁹ Thus, the condition of artwork and furnishings in the stave churches has improved considerably. Nevertheless, the result fell short of the target for the project: namely that on completion all objects should be in category 0 or 1.

There were two reasons for this. Firstly, the condition of 14 untreated objects had deteriorated in the time between the first and second registration and therefore had gone from category 0 to category 1, 2 or 3. The second reason was that the treatment of some of the distemper paint surfaces was unsuccessful. The distemper paint that had been consolidated during the course of the Stave Church Preservation Programme was becoming loose in certain areas. The Directorate for Cultural Heritage has recently started a research and reporting project to uncover the reasons for these setbacks.

With the exception of six decorated wall surfaces from the Middle Ages, which were assessed as being in category 2 or 3 after restoration treatment, all the treated medieval objects were appraised as being in category 0 or 1 at the time of the second registration.

Some considerations

No comparable systematic registration of the status of artworks and furnishings in stave churches had ever been made in Norway before. The registration system developed and improved as the work progressed, especially in the initial stages. Naturally, this relatively quick and easy assessment based on the condition of furnishing and artwork may have led to significant details being overlooked. In retrospect, we see that the registration of the causes of deterioration and damage was inadequate.

Persons with relevant competence and long, extensive experience in the field of conservation were needed to make these status analyses in a unified and effective way.

Table 2. Overview of medieval objects in the stave churches, related to condition and restoration treatment.

Number of churches with medieval objects	22	22
	Status report 1 (2001–2013)	Status report 2 (2013–2015)
(No. of medieval objects)	88	88
No. in category 0 (no treatment needed)	29	38
No. in category 1 (monitoring needed)	21	29
No. in category 2 (treatment needed)	20	17
No. in category 3 (treatment needed urgently)	17	1
Condition unknown (no category given)	1	3
Number of treated medieval objects	27	27
No. in category 0 (no treatment needed)	0	10
No. in category 1 (monitoring needed)	3	11
No. in category 2 (need for treatment)	9	6
No. in category 3 (need for prompt treatment)	15	0

For the most part, the status report was compiled by the same two persons from the Stave Church Preservation Programme because the condition of a single object can be assessed differently by different conservators/restorers. The status report can depend on the individual conservator's conception of when an object's condition is so unstable that treatment is essential. At the very least, a cohesive evaluation of objects was ensured by using the same two persons for registering the condition of church interiors.

Naturally, work on the preservation of the stave churches' decoration did not stop with the end of the Stave Church Preservation Programme. About half the stave churches have heating, which in itself creates challenges for the preservation of art and furnishings. Heating in the winter season creates a dry indoor climate which can cause damage, such as loss of paint. No higher levels of deterioration were found in churches with heating. However, there can be several explanations for this; perhaps primarily due to the scant amount of statistical material, and because the interval between the two status reports comprised only a few years. Damage caused by or related to climate conditions is listed with reservations because no long-term climate measurements were made as part of the registration project.

As a result, a maintenance plan will be drawn up which takes into account the climatic conditions in the churches, combined with data from the status reports.

Prioritising treatment

All the stave church structures have been repaired, but it has been impossible to conserve all the art and furnishings that were in a poor condition, as there is simply too much material. In general, one could say that the priority for treatment in the Stave Church Preservation Programme was given to material dating prior to 1800. Within this limitation, objects classified in categories 3 and 2 were given first priority. Among these, painted medieval objects and wall and ceiling decoration in distemper paint technique were of greatest concern.

The distemper paint decoration was given priority because it often has a predominant visual place in the church interior. Medieval objects received priority because Norway has an unusually rich heritage of church art from the period 1100–1350.¹⁰ The preservation of this material, and research relating to it, are thus of national and international importance.

Other factors guiding priorities for treatment involved concerns about the users of the churches and the location of the art in the interiors. The more fundamental the art and the decoration were for the experience of the church interior, the higher their priority for repair.

The work was done in the churches and in conservation studios. Most of the work was carried out as consolidation projects. In other words, the treatment was limited to the removal of superficial dirt and the stabilisation of unstable structures; for example, loose paint was glued to its backing.¹¹ The examination of such objects was often limited to what was necessary for choosing the optimal method of treatment.

In some cases the objects had such significant cultural history value that they were also examined to reveal how they were made, and how they have changed over the centuries. This applied particularly to church art from the High Middle Ages.

Treatment strategies

Over the centuries, the stave churches were enlarged and altered, some almost beyond recognition. Similarly, much of their art and furnishings also changed as elements from different objects were conjoined in new ways, or were painted over with new, more modern colours and techniques. In this way the art and furnishings were recycled and adapted to the Church's changing religious programme, interiors and new styles. As a result, art and furnishings cannot be evaluated independently of their context. In other words, very persuasive arguments would be needed before any of these historically-related alterations could be reversed by their removal.

The aim of most of the building repairs of the stave churches was to repair them without changing their appearance.¹² This was also one of the objectives of the consolidation projects: stabilising unstable structures while making the minimum of visible changes. Conversely, making visual alterations was the aim of some of the treatments of art and furnishings. We call such treatment 'restoration'. This brings about changes which impact our experience and understanding of an object, and it can sometimes permanently wipe out traces of history.

The choice of treatment methods and treatment objectives in the Stave Church Preservation Programme was based on examinations made by conservators, often in collaboration with art historians and chemists, as well as through professional discussions between conservators and the Directorate for Cultural Heritage. The latter, as the administrator and principal, also had the final say and made the final decisions.

In the following, four different treatment strategies are described, based on the treatment of the calvary group in Urnes stave church, the two crucifixes in Ringebu stave church and the wall decoration in Flesberg stave church.

The calvary group in Urnes stave church: consolidation, no retouching

Numerous international guidelines have been developed for the preservation of different types of cultural monuments and relics. These have been issued to assist those who treat and manage such treasures. If, for instance, one follows the recommendations in *Management Guidelines for World Cultural Heritage Sites* to the hilt, the goal is to secure the cultural relic with as few visible changes as possible. As Urnes stave church with its wooden calvary group is a World Heritage property, it was natural to adhere to these guidelines when the goals and methods for treating the calvary group were being developed in 2001 (ill. next page).¹³

The calvary group is from the 1100s and is the oldest of such sculpture groups in Norway. This alone makes it worthy of preservation. Given that the figure of Christ has not been repainted, and the two figures representing Maria and St. John were repainted for the last time in 1200s, it is quite evident that Urnes stave church houses a unique sculptural group. The calvary group hangs five to seven metres above the floor, on the east wall of the nave, and the details are hard to see in the dim interior of the church. These were key reasons for the choice of treatment method.

The calvary group has been treated once before. In 1957 it was not only cleaned and conserved; large amounts of flaking paint were camouflaged by retouching. In the period 2001–2003, it was also given a protective coating of varnish.¹⁴ However, with reference to the above-mentioned guidelines, the new flaking was not retouched: "... the goal of individual treatment of certain objects is to protect the cultural relic's original material, its authenticity and integrity, and the treatment should primarily be limited to cleaning and consolidation."¹⁵

The Management Guidelines for World Cultural Heritage Sites make allowances for individual treatment principles of specific objects, partly on the basis of their context. The fact that the calvary group hangs high in the nave of the church, and is hard to see, was also noted as an argument for not retouching.¹⁶ The treatment of the group might have been otherwise if it had hung in a more conspicuous place. The flaking paint and gilding might then have been retouched.



The calvary group in Urnes stave church after conservation 2001–2003. Photo: Birger Lindstad, 2003

The two medieval crucifixes at Ringebu stave church: consolidation versus restoration

Ringebu stave church has two crucifixes from the Middle Ages, which we will designate here as Ringebu I (ill. next p. left) and Ringebu II (ill. next p. right). Ringebu I hangs on the west wall of the nave, clearly visible above the entrance door when you walk into the church. It may date from ca. 1300.¹⁷ Ringebu II hangs higher up on the eastern wall of the nave, over what was once the entrance to the choir, where crucifixes were often placed in Roman Catholic times. This too is from the 1300s, but is slightly more recent than the Ringebu I crucifix.¹⁸

The original gilded hair and beards on both figures were painted brown in the Middle Ages.¹⁹ The alterations made in the 1700s were much more extensive. The crucifixes were completely painted over, partly with imitation gilded loincloths, painted respectively in turquoise and blue. The skin colour was made more pallid and corpse-like, and the trails of blood were accentuated and were less decorative than the originals.

The crucifixes were also treated around 1920 in connection with a major restoration of the church. The cross

in Ringebu I was repainted, probably due to extensive flaking, and the figure was given new hands and a new right foot, as the originals had been lost.²⁰ In addition, the turquoise 18th century paint on the Ringebu I sculpture was bronzed, probably to replicate the original imitation gilding. As for the Ringebu II crucifix, however, only minor repairs were made and the 18th century coat of paint was retained.

Because the large amount of flaking observed in the coats of paint on both crucifixes, they had been treated again in the period 2001–2003. Apart from re-attaching the loose paint, both crucifixes were treated very differently.

Ringebu I was “returned” to its medieval form and colours, to the period where the sculpture had brown hair and beard. The sculpture’s secondary, small, uneven hands, as well as the toes on the right foot, were replaced with new ones, carved in the same elegant, outstretched style as the surviving left foot.²¹ Secondary coats of paint on the skin and the traces of blood were removed. The bronze painting of the loincloth was retained, as it was impossible to remove this coat of paint without destroying the original imitation gilding. The cross was partly exposed and partly repainted over the earlier repainting. The aim in treating the Ringebu I crucifix was to achieve the colour we think it may have had prior to being treated in the 1700s.

Ringebu II was cleaned of surface grime, yellowed varnish and miscoloured retouches. The loss of paint which would have been visible from the floor of the church was retouched. The aim of the treatment of the Ringebu II crucifix was to get it to look as it was after it had just been repainted in the 1700s, while retaining traces of the 300-year ageing process it had at that time.

Why would two crucifixes from the Middle Ages, in the same church with approximately the same history of changes, be given such different treatment?

In the preliminary project for the Ringebu crucifixes, a variety of alternatives was considered by a group of experts on the Middle Ages. One consideration was whether to remove all the coats of paint from one or both crucifixes: One of the arguments was that there are many more layers of paint that were worthy of preservation than these, so this should not be a barrier to removing the coats of paint.²²

The conclusion was to consolidate the crucifixes, clean away the dirt and water-soluble coatings of paint.



The Ringebu I crucifix, before treatment.
Photo: Birger Lindstad 2002.



The Ringebu II crucifix, before treatment.
Photo: Birger Lindstad 2002.

Then any prospective additional treatment could be evaluated as this work progressed.²³

Although it was not explicitly expressed in the preliminary project, the quality of the repainting was probably what triggered the discussion about removing it to reveal the qualitatively much better medieval polychrome.²⁴ This was also the starting point of the discussion in the treatment process: “The repainting is amateurish and clumsily done. Some might call it sloppy and ugly.”²⁵ Nevertheless, after further consideration, it was decided that the overpainting on the Ringebu II crucifix was worth preserving, as it had an independent historic value. The advantage was that this overpainting was complete (it covered the entire crucifix), and the conversion of a medieval crucifix to a rococo crucifix was deemed stylistically successful.²⁶

When additional coats of paint are removed, traces of history disappear along with them. Even though we may now find such overpainting uninteresting or lacking aesthetic qualities, as the case was with the Ringebu I crucifix, there is no telling whether this will resonate with future tastes or judgements. With this in mind, the Directorate for Cultural Heritage is quite reluctant to recommend the removal of overpainting. Hence,

it was very unusual for paint to be removed from the Ringebu I crucifix. A standard procedure is represented by the Ringebu II crucifix, even though it would have been tempting here too to expose the original medieval paint. However, it was generally in good shape, and rather unusual, with decorative tracks of blood which form a repeating pattern over the entire painted flesh of the figure.

To put it simply, the Ringebu I crucifix was treated as a work of art and priority was given to making its aesthetic and historic value more visible. The Ringebu II crucifix, on the other hand, was treated as a historic relic that had a history of changes, giving it great value as a source of reference.²⁷

The decoration in Flesberg stave church: revealing, not restoring

Only the nave of Flesberg stave church has survived. When the condition of the art and furnishings in the church was registered in 2002, the medieval walls in the nave were white, with blue imitation wainscoting approximately 150 cm high. Visible beneath the relatively large flaked-off areas of paint were the remains of the earlier decoration of the ambulatory (ill. p. 56,



The Ringebu I crucifix, after treatment. Photo: Birger Lindstad 2002.



The Ringebu II crucifix, after treatment. Photo: Birger Lindstad 2002.



The Ringebu I crucifix, detail of the face, right side over-painted. Photo: Birger Lindstad 2002.



The Ringebu I crucifix with the over-painting removed and re-touched. Photo: Birger Lindstad 2003

top left), not dissimilar to the 1650s decoration in Nore stave church.²⁸ The white paint was assessed to be in category 2, as there was "... loose paint across the entire white surface".²⁹

Even back in 1988 there were clear doubts about the preservation value of the white paint, because a small area of paint was removed down to the 17th century decoration.³⁰ Such doubts are also evident in the recommendation following the registration of its condition in 2002: "If the existing [white] paint is to be preserved, consolidation of the loose paint is recommended ..."³¹

It turned out not to be a consolidation project, but rather a restoration project. In 2007–2008 all the overpainted layers were removed, revealing the 17th century decoration. There were several reasons for doing this. From a technical viewpoint, it was a formidable task to fix the thick overpainting, which consisted of not just one coat, but four.³² In addition, members of Flesberg parish considered the partly-peeling white wall "disgraceful" and they were keen to have the decoration from the 1600s visible again.³³ The Directorate for Cultural Heritage conducted a paint removal test, and concluded that the decoration from the 1600s should be uncovered.

The most arduous and time-consuming paint removal work was done by painting conservators and students. When the removal was complete, about 42 m² of overpainting had been removed, mainly using scalpels. The exposed 17th century decoration has only partially survived, and the colours are very faded (ill. next p. to the right), compared with the corresponding decoration in Nore stave church.

The objective and the method were discussed in the status report. "The main aim of the paint removal in the Flesberg Church was to unveil and impart some of the church's older history, while simultaneously wanting to raise the aesthetic level of the interior. The uncovering of such large surfaces, such as those in Flesberg, generates a number of professional ethical dilemmas. It is inherently problematic to remove one or more historic period at the cost of another."³⁴ A reference area was retained in the organ gallery to retain the traces of the repainting history.

The decoration on the former ambulatory was not retouched. The reason was that if one were to "... raise the legibility or the aesthetic level, this would add a considerable amount of 'new' material in the form of sup-

plements and retouching. In our opinion, the fact that what is uncovered (and has survived) is 100% original is more important for the impression of authenticity and the historic source value than if one were to augment and add new material".³⁵

Different preservation values

As the above examples illustrate, there is no general solution regarding how cultural monuments should be treated and preserved. The goal and the methods naturally change with the passage of time, conditional on the values we wish to uphold and demonstrate through a cultural relic, and the particular history we want to visualise and tell. This is why the *Management Guidelines for World Cultural Heritage Sites* is just one of many advisory documents for the protection and preservation of art and cultural monuments. Such documents can be beneficial when considering questions linked to preservation strategies. They can contribute to cool-headed analyses of the often complex history of alterations and visual appearance of a specific cultural monument or object.

Different conservation values are thus weighed against one another and have been given different emphasis in the hundred years or so that the Directorate for Cultural Heritage has had responsibility for the preservation of art and furnishings in the churches.³⁶ In certain cases, the value of the experience steers the treatment. Perhaps this was the case when the chancel of Rollag stave church was given a fresh coat of paint in 1933: a desire to recreate something that was lost. Perhaps it was this experience value which indirectly set the stage when Professor Erla Hohler of the University of Oslo argued in favour of retouching a damaged medieval sculpture, in order to "increase its 'legibility' and improve its overall impression".³⁷ The treatment of the Ringebru I crucifix can be seen and understood in this context.

So it is interesting that even though the discussions linked to the uncovering of the distemper paint decoration in Flesberg stave church revolved around making its older history visible, the choice was made not to retouch it, enabling the viewer to experience it as authentic. This authenticity is a fact, inasmuch as nothing new has been added; what one sees may well be the same as a viewer saw before the decoration was painted over for the first time. However, the decoration today does not give an



Flesberg stave church, north wall of the nave, detail before removal of overpainting. Photo: Jørgen Solstad, NIKU, 2006.



Flesberg stave church, north wall of the nave, detail after several layers of paint had been removed and the arcade painting from the 1600s became visible. Photo: Iver Schonhowd, Riksantikvaren 2013.

authentic picture of how the decoration looked when it was new.

Another criterion to be considered prior to treatment is the source value of an object. In principle, one should do nothing other than ensure that an artefact's decay is slowed down as much as possible if it is primarily perceived as a historical source. The treatment of the calvary group in Urnes can be regarded in this way, and this principle forms the basis for most treatment of art and furnishings in the Stave Church Preservation Programme.³⁸

In 1962, the antiquarian and future Director General for Cultural Heritage Stephan Tschudi-Madsen summarised the status of the Directorate's treatment of church art: "The ever-increasing tendency toward more conservation and less restoration has been discernible for some time and to no small degree impacts our views today."³⁹ This statement is still applicable and forms the basis for most of the treatment of art and furnishings conducted in the Stave Church Preservation Programme: stabilising weakened structures and removal of surface dirt and grime, if necessary combined with a cautious retouching of the most conspicuous damage.

The treatment of the Ringebu II crucifix falls in this category. However, the removal of overpainting to reveal the underlying decoration, which was done in the nave of Flesberg stave church, or the removal of coats of paint combined with repainting and the reconstruction of lost sculptural elements, as with the Ringebu I crucifix,

would have only been rarely carried out throughout the second half of the 20th century.⁴⁰

These different principles of treatment are illustrated further when comparing the treatment of the wall decoration in Flesberg with the treatment of a very similar wall decoration in the chancel of Rollag stave church. The uncovered Flesberg decoration looks old and worn, which of course it is. The highly colourful Rollag decoration is dated to 1683, but it is actually from 1933. This is when a coat of overpaint was partly removed and the decoration was "repainted ... on the remaining film of protective overpainting" (ill. next p.).⁴¹

Above all, the preservation of the source value of original decoration has been emphasised in all the restoration projects in the Stave Church Preservation Programme. The two overriding principles have been 1) that no treatment shall be conducted which reduces future choices of treatment and 2) all treatment must be documented.

New knowledge about the decoration of church interiors

In 1982 the art historian Sigrid Christie called attention to possible scenarios in art history: "... In addition to the method of evaluation based on design and style and the historical method of investigating sources and documentation, we now have the technical method. Currently, those who can primarily assist the art histo-



The decorative distemper painting in Rollag stave church is from 1933 and is painted over a partially-uncovered decoration from 1683. Photo: Jiri Havran, undated.

rians in their research are technical conservators. This is where we can expect the real innovations.”⁴²

In the Stave Church Preservation Programme, new, essential knowledge about this material has indeed been acquired through technical studies of art and furnishings. Examinations of objects that are important from a cultural and historical vantage point have provided new knowledge of how they were made, how they could have looked when new and how they have changed through processes such as ageing or overpainting. X-ray and infrared examinations have provided new information about the hidden structures in the load-bearing material and in coats of paint. In the following examples, the focus is on projects in which original or earlier appearances were reconstructed, digitally or as coloured drawings, and the

projects where photo-technical tests revealed or clarified what was hidden beneath the overpainting.

Urnes stave church, a calvary group from the 1100s
The calvary group in Urnes stave church was examined in connection with its treatment. The study produced new knowledge about its medieval polychromy with regard to the use of materials as well as the appearance.⁴³
The calvary group probably dates from the second half of the 1100s.⁴⁴ Even though some of the colours and gilding of the calvary group are missing, the colours have partly changed (mainly darkened) and metal foils have oxidised, it is still magnificently well-preserved, given its age.⁴⁵ Nevertheless, it is hard to envision how the calvary group looked 800–900 years ago.



Reconstruction of how the calvary group in Urnes stave church could have looked like in the 1200s, after it was partly overpainted. Digitally rendered by Anja Sandtrø ©NIKU, 2003.

The polychromy from the Middle Ages was digitally reconstructed through an analysis of the wood, chalk, pigments and binding agent, as well as studies of the stratigraphy of the colours and the gilding (ill. above). The analysis results have been clearly detailed in Norwegian and English previously, so only the most important results will be mentioned here.⁴⁶

The three figures – Christ, Maria and John the Baptist – are carved in alder, whereas the cross is made of aspen. Alder and aspen were native to Norway in the 1100s, which indicates that the sculptures may have been carved in Norway. The sculptures are primed with Channel region chalk, which indicates that the sculptures – if indeed they were made in Norway – were made on the west coast.⁴⁷

Later, probably in the 13th century, the entire calvary group was polychromed once again, with the exception of the Christ figure and the back side of the

group. A new primer was given to the Virgin Mary and the St. John the Baptist figures, as well as the cross. Round cross medallions were added to the cross, made of pine painted with evangelic symbols, and the cross was re-gilded with imitation gilding made of silver foil overpainted with a golden glaze, in contrast with the first imitation gilding made of tinfoil as a reflective backing to the golden glaze. The painter's palette was also changed by access to new, oil-based red and green glazes. The calvary group, with the exception of the Christ figure, was adapted to 13th century fashion.

Why were parts of the calvary group at Urnes re-polychromed after just a few decades? There are no written sources to go by and no unambiguous answers to be drawn from observations of the calvary group and its location in the church. What we know is that there are scant areas of the 12th century polychromy preserved beneath the 13th century polychromy. This could be because the initial polychromy was scraped away when the new paint was applied, or because it was damaged. If damage was the reason, it is odd that the Jesus figure and the painted back side of the calvary group are not damaged as well.⁴⁸

If the re-polychroming was ordered by the owner (or the seller, in case of a transfer of ownership) who wanted to modernise the calvary group, it is odd that the Christ figure – the most important – was not also repainted. Whatever the reason for the polychroming, the result was that afterwards the Urnes group had the appearance of a Romanesque carved calvary group, with a mixture of Gothic and Romanesque polychromy.

Hedalen stave church, a crucifix from the 1200s

The Hedalen crucifix is from the second half of the 13th century.⁴⁹ The crucifix was overpainted and used as part of the church's altarpiece in the 1700s and that is where it still stands in the church.⁵⁰

It was inspected while being consolidated, cleaned and retouched in 2008 (ill. next p.). The objective was to find out what the crucifix looked like when new, how it was made and from which materials. The cross is made of alder.⁵¹ The sculpture consists of three parts; the arm piece, the body with the head and crown of thorns, and the halo. The halo is made of pine and the other parts are of birch.⁵² All these tree species grew in Norway during the Middle Ages, which means that the crucifix could have been made in Norway. There is uncertainty



The altarpiece in Hedalen stave church. The altarpiece is a collage from the 1700s, composed of a medieval crucifix and a medieval tabernacle which was then brought up to date with rose painting. Photo: Birger Lindstad 2007.

about the halo's originality, as no comparable halos have been registered among medieval Norwegian crucifixes. Other crucifix halos are all fastened to the cross, not the figure.⁵³

The result of the study of how the crucifix could have looked when new is seen in on next page. The polychromy is representative of the second half of the 1200s. The cross is green, with imitation gilded and red detailing. How the four trefoil-shaped cross medallions were decorated is unknown. An underlying dark red

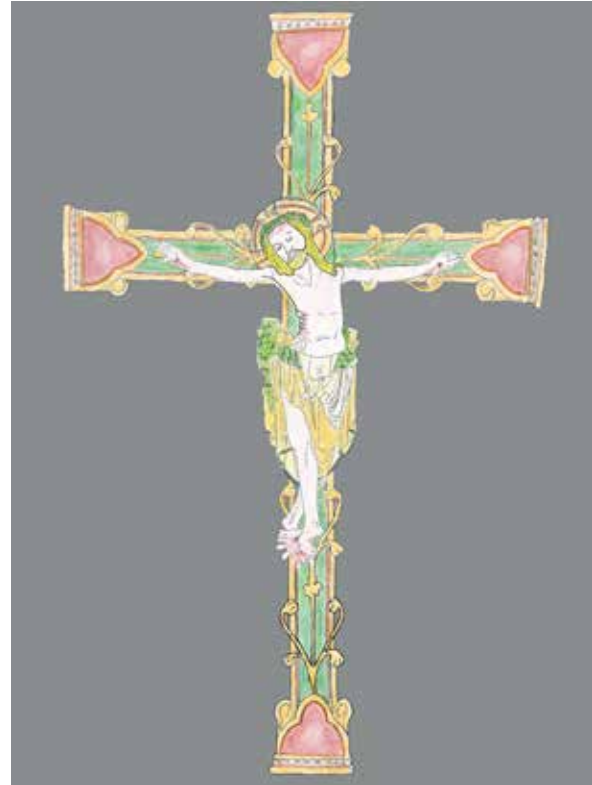
hue is visible in a tiny peeled-off part on one of medallions, and a decorative band has been documented on the cavetto of the outer part of the cross medallion using infrared photography. The observations trigger associations with the cross medallions in the Ringebu I crucifix's golden evangelist symbols on red-glazed silver foil (ill. p. 61, left). The medallions' cavettos are painted in red shades and decorated with a black band. The Hedalen crucifix's medallions may have been decorated in a similar way.⁵⁴



The crucifix in Hedalen stave church, after conservation in 2007. Photo: Birger Lindstad 2007.

Christ had a pale, smooth, skin colour, half-closed eyes and golden hair, beard and moustache.⁵⁵ Decorative tracks of blood ran from his nail wounds. A golden loincloth wrapped around his hips had a yellow lining and a green and black striped belt. An infrared photo-analysis of the halo, now painted grey, shows that it dated from the Middle Ages. A red cross, contoured in black is painted on an imitation gilded base (ill. next p., left). The halo is stylistically reminiscent of the cross halos on panel paintings of this period, for example the Heddal frontal from around 1250.⁵⁶

The investigation of the Hedalen crucifix revealed new information. Firstly, the sculpture is carved from birch and not oak, as previously assumed.⁵⁷ Secondly, the halo is original and it was decorated with a cross pattern in imitation gilding. Thirdly, the little relief from the 1200s, which hangs in the chancel of the church, did not, as had been assumed, belong to the lower cross medallion.⁵⁸ The study also provided information about the crucifix's original polychromy. An evaluation was also made of where the Hedalen crucifix was originally located in the church. Based on measured drawings of the stave church, it has been shown that there was sufficient space for it either on the east wall of the nave, or on an altar in the chancel entrance.



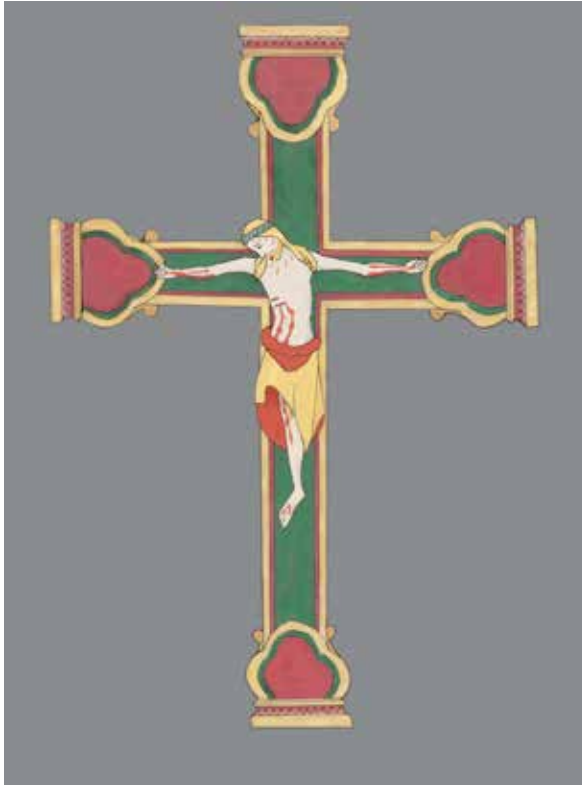
Reconstruction of how the Hedalen crucifix may have looked in the 1200s. Drawing: Mille Stein, NIKU, 2008.

Triptychs in Hedalen and Reinli churches

Arguments have been previously made on the basis of art history methodology that the back wall of the Hedalen stave church triptych (ill. previous p.) was originally the corpus, in other words the cabinet part, of a Madonna triptych for the Hedalen Madonna.⁵⁹ Similarly, arguments have been put forward that a church model which is also in the church, originally crowned the Hedalen triptych.⁶⁰ The Madonna sculpture and the model of the church are in a very good state of preservation and have never been overpainted. They are from ca. 1250.⁶¹

The rear wall of the altarpiece was analysed when the triptych was consolidated, cleaned and retouched as part of the Stave Church Preservation Programme. The investigation utilised technical methods to test the theory that the rear wall was originally part of the Hedalen Madonna triptych.

The investigation showed that the niches in the corpus had originally been gilded with imitation gilding



Reconstruction of how the Ringebu I crucifix could have looked like in the Middle Ages. The symbols of the evangelists in the cross medallions have not been drawn in. Illustration by Tove Nyhlén and Mille Stein, NIKU 2003. Digitally rendered by Anders Amlo, Riksantikvaren 2016.

and the gilding was engraved. The outline of these cuts, visible when lit, showed these scratches formed small reliefs. The reliefs portrayed scenes with the Virgin Maria and Jesus from his birth and childhood history, which again confirmed that this was a Madonna triptych.⁶² An infrared examination of the arcade arch in the triptych showed that it was decorated with painted images of holy buildings with towers (ill. above, right), equivalent to an arcade arch fragment from a medieval triptych in the neighbouring Reinli church and other Madonna triptychs in Sweden and Finland.⁶³ The investigation also showed that the exterior of the triptych was decorated with a red and green chequered pattern.

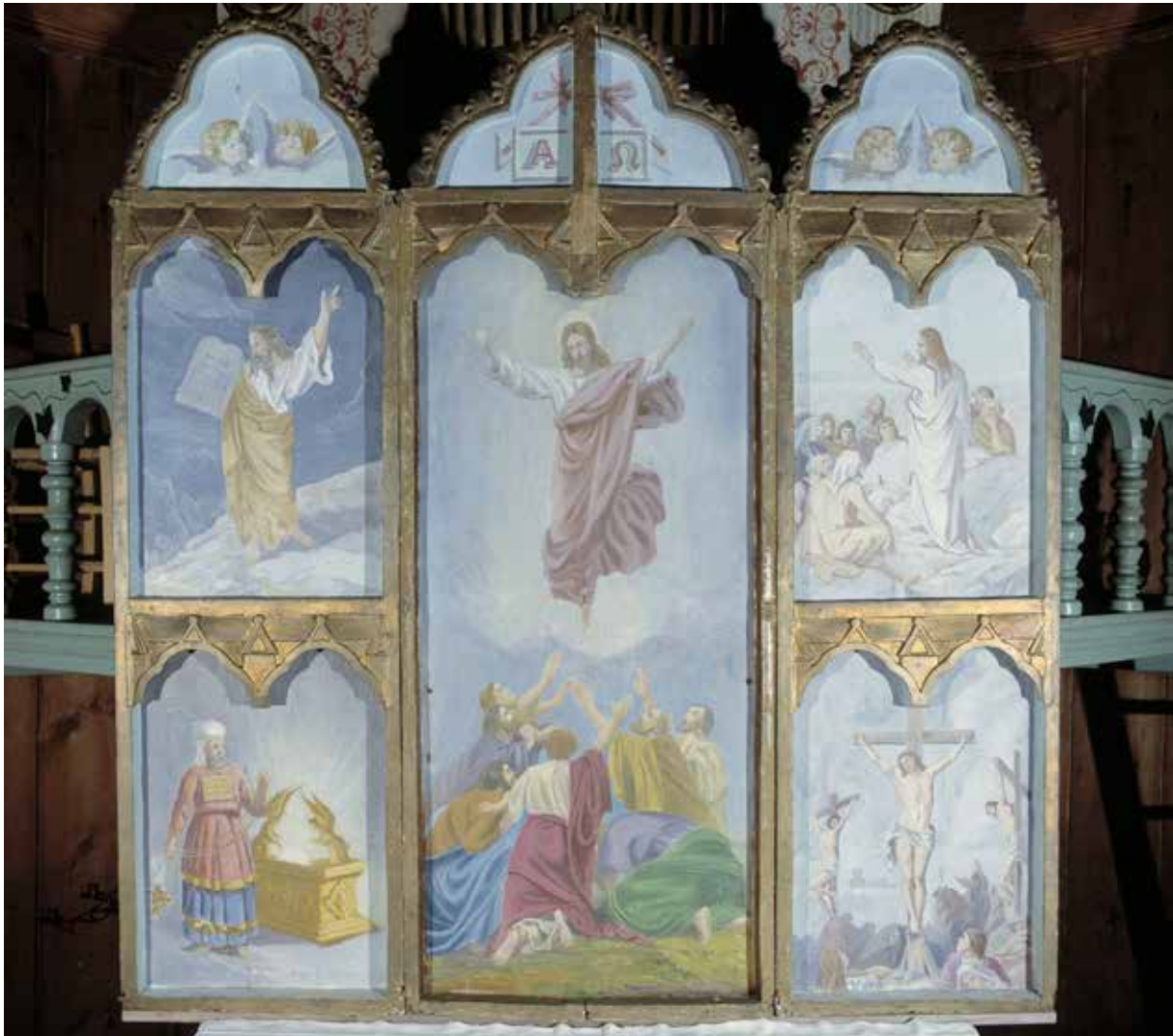
These results were used to develop a proposal of how the Madonna triptych's corpus could have looked in the Middle Ages.⁶⁴ With the help of scale drawings of the medieval church, it has been shown that the triptych



Reconstruction of how the Hedalen tabernacle may have looked when new, in open and closed position. Infrared photograph of the arcade arches are marked in grey. The reliefs in the niches are missing, but their outlines have been sketched in. Digitally rendered by Elisabeth Andersen, NIKU, 2009.

could have stood on the side altar in the nave in the 1200s and the 1300s. If it were placed on the side altar, there would not have been enough room to fully open it out on the holy days commemorating the Virgin Mary. Alternatively, it could have been placed on a side altar on the north wall of the nave. Less likely, but with sufficient space, it could have stood on the main altar of the church.⁶⁵

Reinli stave church, like its neighbour at Hedalen, has an altarpiece made from the sides of a completely-over-painted medieval triptych (ill. next p.). With the help of surface investigations of the altarpiece, carried out in connection with the consolidation, and interpretations of old written sources, a reconstruction was made to show how the altarpiece could have looked in the Middle Ages (ill. p. 63).⁶⁶ It shares many characteristics with the Hedalen triptych. This was also very probably a Madonna triptych, modelled on the one in Hedalen. We assume that it had small reliefs in the niches, like the Hedalen triptych, triptych but we know that the arcade arches above the niches in the Reinli triptych were decorated in the same way as the Hedalen triptych has been shown to be, with small painted tower buildings.

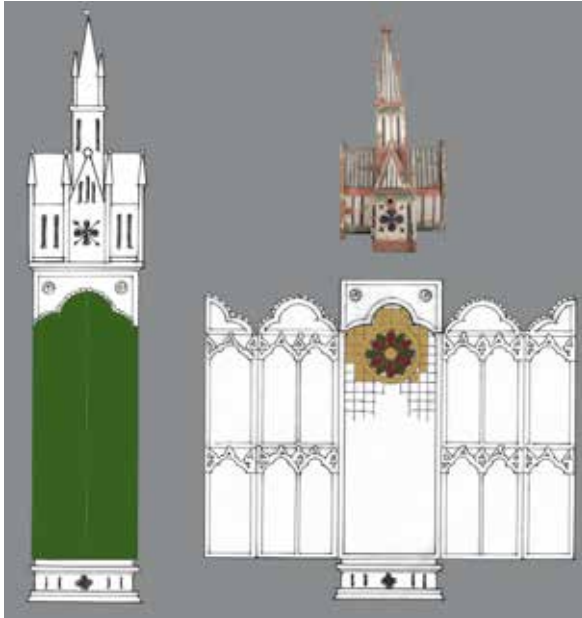


The altarpiece in Reinli stave church is made from the doors of a medieval tabernacle. The paintings are from 1923. Photo: Birger Lindstad, undated.

The material used, however, differed here. Whereas the Hedalen triptych was made of oak, the one in Reinli is of pine. Moreover, the Hedalen triptych was primed with Channel region chalk whereas the Reinli triptych was primed with Continental chalk.⁶⁷ The difference in the use of material may indicate that the triptychs were not made simultaneously and/or at the same workshop.

The difference between the richly decorated interior of the triptychs and the spartan exteriors is remarkable, especially considering that they were normally kept closed. This is all the more notable when comparing

them with altarpieces from the Late Middle Ages, which often had images of saints painted on the exteriors. The art historian Elisabeth Andersen from NIKU has the following hypothesis about this: “When the Madonna triptych was closed, it gave the illusion of being a closed reliquary or a golden chest, perhaps covered with brocade or other cloth ... We know little about the use of these Madonna triptychs. However, they would have been closed during Lent, and at a minimum been opened on holy days ...”⁶⁸



Reconstruction of how the Reinli tabernacle may have looked when new. The outer sides of the doors may have had a faint marbled pattern in the green area. We do not know what the figure of Mary (?), the reliefs in the door niches and the plinth would have looked like. The crown is in the Museum of Cultural History, University of Oslo. Reconstruction of the altarpiece digitally rendered by Elisabeth Andersen, NIKU, 2009.

The two medieval crucifixes in Ringeby stave church, original appearance

The two crucifixes in the Ringeby Stave Church have received scant mention by art historians. When they were being treated in 2001–2003 they were examined to reveal how they could have looked when new.

The Ringeby I crucifix (ill. p. 54, top left) turned out to comprise a cross and a figure which had not originally been conjoined. There are attachment marks (holes) on the sculpture and the cross which do not correspond with one another and analyses of the chalk from the cross and sculpture show that the chalks do not come from the same geological period and area.⁶⁹ The cross is made of pine.⁷⁰ Apart from the arms, which are probably from a conifer, the sculpture is made of oak.⁷¹

As mentioned, the Ringeby I crucifix was partly uncovered in 2001–2003, allowing its original flesh-colour and tracks of blood to be seen.⁷² The examination of the sculpture showed it originally had gilded hair, beard and

moustache and the loincloth was a gold colour with a red lining. A drawing was made showing the original colours of the crucifix according to the analyses.

The shape and polychromy of the crosses are typical of those from the second half of the 1200s, but the large, decorative trickles of blood on the Christ figure point towards the first half of the 1300s.

The Ringeby II crucifix (ill. p. 54, top right) retained, as mentioned, its overpainting from the 1700s.⁷³ With the help of observations of its surface, cross-section studies of paint samples and infrared filming of the arms of the cross, a representation was made showing how it could have looked when new (ill. next p. left). Like the Ringeby I crucifix, it portrayed the Passion, with tracks of blood which were even more conspicuous, forming a regular and repeating pattern against the bare skin. The hair and beard on this sculpture were also gilded, and here too the loincloth was imitation-gilded with a red lining. The arms of the cross were adorned with evangelical symbols, as on the Ringeby I crucifix.

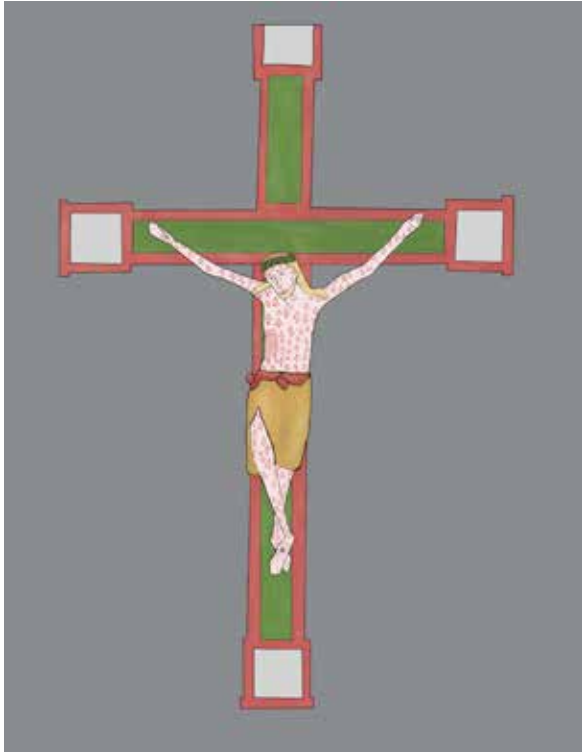
By comparing the Ringeby crucifixes with other High Middle Ages crucifixes, one can estimate that the Ringeby I crucifix was from the second half of the 1200s, whereas the sculpture was made a little later; and the Ringeby II crucifix is from the period directly prior to the Black Death, in other words, around the mid-1300s.

These crucifixes have received very little recognition among art historians, perhaps because of the condition of the Ringeby I crucifix and because of the Ringeby II crucifix's overpainting and its inaccessible location in the church. Hopefully, the treatment and analyses of these crucifixes will result in more attention.

Rollag stave church, distemper paint decoration on the wall plate of the nave's eastern wall

A previously unknown fragment of wall decoration was exposed when the Winter epitaph, which hangs on the chancel wall in the nave of Rollag stave church, was undergoing conservation in 2003.⁷⁴

The decoration is painted on the lower wall plate in distemper paint (ill. next p. right).⁷⁵ Small white cross quarters on a light red base paint adorn each of the diagonal squares of a checker pattern. The bands that form the chequered pattern are alternately pink and pale grey. These bands are contoured with a black line and filled with black loops. The decoration may have



Reconstruction of the original polychrome of the Ringebu II crucifix. Note that the hair on the crown of the head is not gilded. This may have been to save on the use of expensive gold as the crown of the head could not be seen from the floor. Illustration by Eva Storevik Tveit, NIKU 2003. Digitally rendered by Anders Amlø, Riksantikvaren 2016.

covered the lower wall plate or it could have covered all or parts of the nave's eastern wall before the church was renovated around 1760.

The composition of the decoration, with its stylised flowers in a diagonal chequered pattern, is reminiscent of the wall decoration of the backdrop wall of the lectorium in Torpo stave church, and on the decoration of some of the surviving planks from Lårdal stave church. The Torpo decoration dates from the period 1260–1275,⁷⁶ The Lårdal decoration is from ca. 1300. Comparable motifs are seen in the carved frontals from Kinsarvik (ca. 1275) and Møðruvellir (1300–1318) in Iceland.⁷⁷

Dating made on a stylistic basis should, if possible, be verified by other methods. If the wall decoration is from around 1300, the wall plate must be contemporaneous, or older. So the wall plate was tree-ring dated.



Decorative distemper painting on the lower wall plate in the chancel screen in Rollag stave church. The decorative painting has been hidden by an epitaph for almost 300 years. Photo: Mille Stein, NIKU, 2003.

This showed that the tree was felled soon after 1431. Therefore the decoration dates at earliest from the mid-1400s. A number of art historians were asked to assess the dating of the decoration based on the age of the wall plate. The conclusion is that such medieval decorative bands survived and continued to be used as a motif for several centuries.⁷⁸

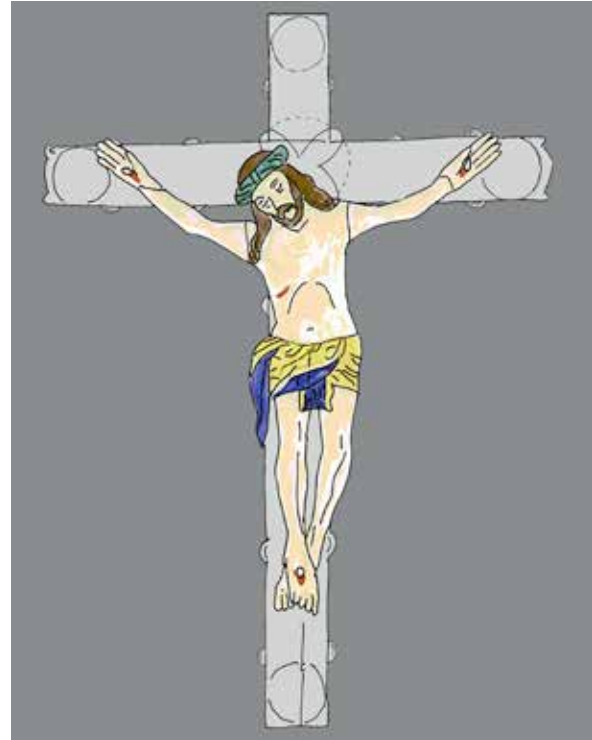
Rollag stave church, a crucifix from the 1400s

A crucifix hangs on the chancel wall of the nave in Rollag Stave Church (ill. next p. left).⁷⁹ It has been dated to around 1450–1500 and is thought to have been made in Norway.⁸⁰ The crucifix has been overpainted, the figure once and the cross three times. The crucifix was examined to determine its original polychrome appearance and to test the theory that the arms are secondary.^{81,82}

Chalk analyses showed that the chalk used to prime the arms differed from that used to prime the hand and torso. X-rays of the crucifix showed that the arms were carved from a different type of wood – probably oak – than the hands, the figure and the cross, which are all probably in pine. The x-rays also revealed that repairs had been made to the attachments of the arms. Nor do the arms match the hands, they are much too thin. Holes on each of the arms of the cross may mean that the hands were originally fastened closer to the body than they are now. The study confirms that the arms and torso did not originally belong to one another, and



The Rollag crucifix photographed after treatment in 2005. The veining on the cross is from 1942 and may be an imitation of earlier veining on the cross. Photo: Arve Kjersheim 2005.



Reconstruction of how the Rollag crucifix may have looked like in the Middle Ages. Drawing: Brit Heggenhougen, NIKU, 2006.

the use of pine indicates that the sculpture was made in Norway.

The examination confirms the hypothesis about where the sculpture was made, and that the arms are secondary. This investigation also produced new information about the cross: in the middle of the cross there were four carved quarter circles which together form a cross halo.⁸³

A representation of how the sculpture's original polychromy looked was made on the basis of this study (ill. above, right). The original paint on the cross has decomposed too much to be reconstructed.

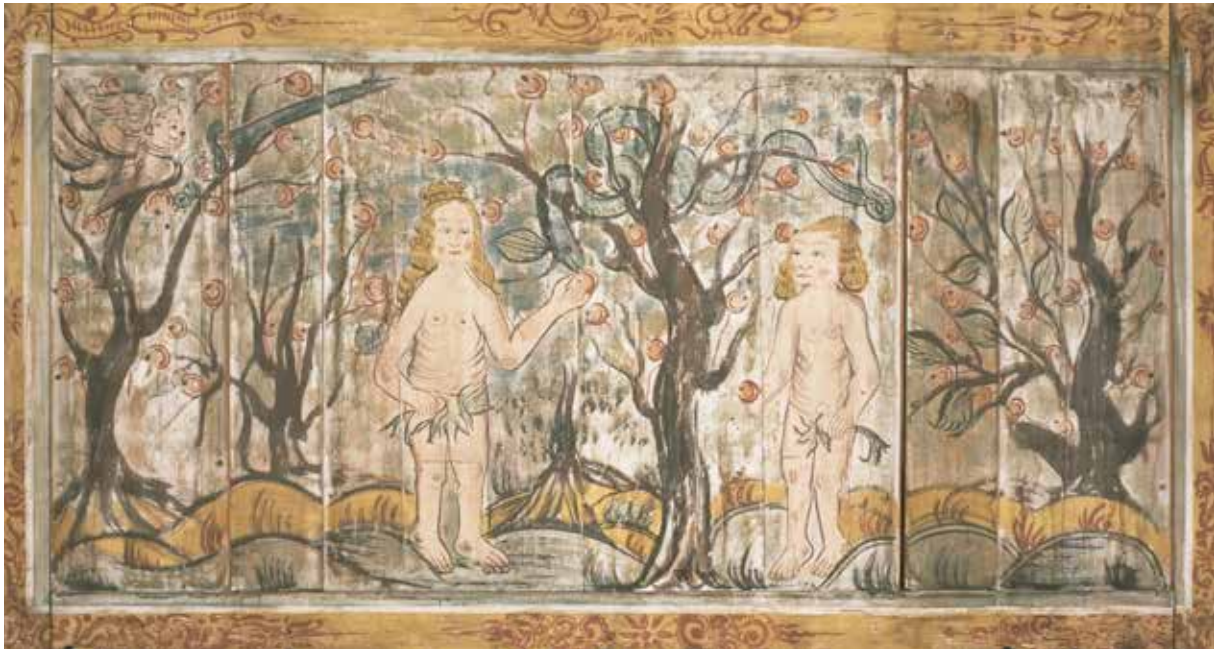
*Rollag stave church – The Fall of Man:
the rediscovery of a forgotten painting*

When the Winter epitaph from 1653 was taken down from the chancel wall for conservation in 2003, a medieval fragment of the wall plate was not the only surprise. It turned out there was a painting on the reverse side of the epitaph (ill. next p.). It was done in distemper paint

and portrays the *Fall of Man*.⁸⁴ A double-sided painted epitaph is unusual in its own right, and a distemper painting on wood is also unusual.⁸⁵

The chinks used on both sides of the epitaph were analysed. They originate from two different geological eras. This indicates that they were not done by the same painter, and/or may not have been painted at the same time.⁸⁶

The chancel ceiling features cloud paintings from round 1760. The cloud painting is sufficiently transparent to allow the underlying decoration from 1683 to be seen.⁸⁷ One of the figures in this 1683 decoration looks very much like the way Adam (ill. p. 67, left) is portrayed in *The Fall of Man*. It was photographed with an infrared camera to make the original paint more visible (ill. p. 67, centre). Later, the marbled exterior of the back of the "Frustolen" (Lady's Seat) in the northwest corner of the chancel was photographed using infrared photography (ill. p. 67, right).⁸⁸ It was a big surprise when yet another overpainting was discov-



Rollag stave church. *The Fall of Man*, after consolidation and cleaning. The painting has not been retouched. Photo: Arve Kjerseim 2005.

ered, very similar to the ceiling decoration from 1683. It seems that the painter who decorated the ceiling in 1683, also painted *The Fall of Man* and what is now known as the “Lady’s Seat”. This *Fall of Man* was also painted about 30 years after the epitaph.

Where in the church could the epitaph have been hung to make both sides visible? Or was it, as the art historian Henning Laugerud of the University of Bergen has suggested, that *The Fall of Man* was just a preliminary sketch for a similar painting in Uvdal stave church, possibly from 1684, and the Rollag picture was never meant to be displayed in Rollag Church?⁸⁹

This is hard to determine with certainty. *The Fall of Man* painting in Uvdal is painted on the upper part of the chancel’s eastern wall, which is visible from the nave. This wall painting thus indicates that Rollag’s *Fall of Man* painting was also meant for churchgoers to see. However, the two renditions of this Biblical fall are too different to have been done by the same painter. Ola Storsletten from NIKU, has shown by means of a reconstruction of the eastern wall of the nave, that there was space for the epitaph in the chancel opening before the church was renovated in the 1760s.⁹⁰ There may have been space above the epitaph for the little

gable section that has protected the wall decoration of the wall plate against dust. If the epitaph has hung this way, the churchgoers would have seen *The Fall of Man* when coming out of the chancel, for instance after receiving communion.

It could have hung this way for some decades before being moved higher up on the chancel wall. The Rollag Church Record from 1733 states that the epitaph hung “over the door of the chancel, on the side facing the parishioners,” which is where it hangs today.⁹¹ While confirming the veracity of this description of the epitaph’s location, the church record makes no mention of *The Fall of Man*.

The puzzle of *The Fall of Man* is still not solved. It was hidden from view for at least 275 years, and it was again hidden when the epitaph was hung in its place at Rollag after being examined and conserved in 2005. Soon it may once again be forgotten by most people.

Research on the decoration of the stave churches

Since the 1970s, several research groups in Norway have conducted systematic examinations of the country’s immovable church art from the High Middle Ages. The results of research on the calvary group from Urnes,



Detail of Adam in *The Fall of Man*.
Photo: Arve Kjersheim 2005.



Infrared photo of the ceiling in the nave of Rollag stave church shows an overpainted ceiling painting with a man's face from 1683. Photo: Henrik Smith, NIKU, 20006.



A similar man's face can be seen in the infrared photo of the over-painted «Lady's Seat» in the nave. Photo: Edwin Verweij, NIKU, 2014.

the crucifixes in Hedalen, Ringebu and Rollag, and the altarpieces in Hedalen and Reinli have supplemented this information, including virtual reconstructions of original polychromy.

We still know little about how the stave churches' interiors looked in medieval times. It is easy to imagine gloomy spaces, weakly lit by a little daylight from a few slots or peepholes high up on the walls, and by candles lit during mass. However, they may not actually have been so dark. If the walls and ceilings were undecorated, the walls would have seemed lighter than they do today, for example at Borgund, because pine is essentially a light material. It darkens primarily under contact with sunlight. It is possible that some of the stave churches were decorated with textiles on the walls. These would not only have added warmth but could also have helped make the interiors brighter. Small holes have been found high on the walls of several stave churches – Urnes, Hopperstad and Heddal – which have been interpreted as holes with a function for hanging textiles.⁹²

Some of the stave churches may have been adorned on the inside with distemper paint decoration which helped make the interior brighter. Earlier documentation has attested to medieval decoration of two staves in the chancel of Hopperstad stave church and remnants of medieval paint in the distemper technique on the baldachin above the altar wing. In Hedalen stave church, fragments of figurative painting have been found on the wall of the altar wings in the nave. Four painted planks

from Lårdal stave church (demolished) have survived with depictions of saints from the Middle Ages.

In Torpo and Ål stave churches, the brightly-coloured decoration on the lectorium baldachin and the back walls contributed to reflecting whatever light was inside the churches, and finally, in 2007 a photo-technical examination was carried out in Heddal stave church to document overpainted medieval painting on the north wall of the chancel. Painted on a light base were: "... a head with a face in profile and a crown, three towers, at least six coltsfoots [flowers] and several areas with folds of textiles".⁹³ The discovery of distemper paint decoration on the wall plate at Rollag stave church goes even further to support the theory that the stave churches' walls and furnishings were decorated with figurative paintings and decorative patterns. In other words, there are still large gaps in our knowledge.

Technical analyses of the materials of the post-Reformation art in the interiors of stave churches have barely begun. Those carried out in the Stave Church Preservation Programme, for instance at Rollag stave church, were done in an attempt to find suitable conservation treatment methods. The results were promising and will hopefully trigger more of these examinations.

Sigrid Christie's research scenario proved to be correct. In addition to working with conservation on a preventive and practical level, she devoted her attention to an increasing degree to questions of how artistic and cultural history artefacts were made, and with which materials. This interest in the materiality of the works of

art requires cooperation with a number of professional disciplines within the natural sciences.

Perhaps a new understanding will be achieved through this meeting of history-based and technology-based analyses of artistic and cultural objects. This is primarily a matter of sharing knowledge and maintaining a dialogue to place new observations in a meaningful art and material history context. Hopefully, this is illustrated successfully by the multidisciplinary cooperation generated by the Stave Church Preservation Programme.

Some conclusions

The Stave Church Preservation Programme has generated new knowledge on many levels about the art and furnishings of the stave churches.

Firstly, the condition register of art and furnishings in stave churches has established a coherent overview of what exists where, and in what condition, in a clear and searchable way for the Directorate for Cultural Heritage. The condition register has provided a useful tool for the Directorate in its planning and budget estimates for the implementation of the Stave Church Preservation Programme and will be used to establish knowledge-based

monitoring and maintenance programmes for the various types of objects in their different climates.

Secondly, the Directorate for Cultural Heritage aims to preserve art and furnishings in the stave churches where they belong, *in the stave churches*, for the enjoyment of present and future users and visitors. This can be done by controlling the climate in the stave churches to minimise decay, and by consolidating unstable structures in objects that are in a poor condition.⁹⁴ Out of consideration to church users, the Directorate for Cultural Heritage has also chosen to carry out conservation work that camouflages damage by retouching, so that the objects appear to be well-maintained, and expose coats of paint which help visualise earlier eras in a church's history.

Thirdly, art and furnishings in the stave churches represent sources of knowledge about our common past. As a result, certain objects have been given special attention in the Stave Church Preservation Programme. They have been analysed to reveal how they were made, which materials were used and how they may have looked before being overpainted. Nevertheless, much remains to be done in researching the interiors of stave churches. We still lack knowledge about what could have been highly colourful church interiors.

4. TO THE GLORY OF GOD AND THE CHURCH'S ADORNMENT

Distemper painting in the stave churches

STONE MARIE OLSTAD

Borgund stave church; the epitome of a stave church – tarred on the outside and unpainted on the inside. However, the bare wooden interior cannot be traced back to a long, unbroken tradition of unpainted churches. The decorative distemper painting which probably graced the walls with plant and floral designs, tendrils and draperies from the 1600s, were washed off when the church regained its medieval stave church appearance, as interpreted at the end of 1800s.¹ The decorative painting in several stave churches were removed or overpainted, covering the colourful décor with monochrome surfaces at a time when deterioration, liturgy and fashion all called for changes to church interiors. Nineteen of the stave churches have visible distemper painting from the period 1200-1800. Seven of these have painting – or fragments of paint – in distemper paint from the 1200s surviving *in situ*.² Distemper painting is characterised by a porous, usually matt surface and usually has vivid colours.

Introduction

This chapter is based on knowledge of distemper decorative painting which was acquired through the Stave Church Preservation Programme and the research and development work carried out by conservators at the Norwegian Institute for Cultural Heritage Research (NIKU) from the late 1980s.³ The Stave Church

Preservation Programme provided an opportunity to work with the fixed décor that needed treatment: three medieval distemper decorative paintings and 12 post-Reformation paintings in 14 stave churches. The accumulation of information has been limited to work that was essential for cleaning and consolidation.⁴ The fact that a considerable number of distemper decorative paintings have been evaluated and treated over a longer, but limited, period has given us strong empirical material for comparisons of motifs, evaluations of painting techniques and treatment methods. An assessment of consolidation methods for distemper paint began in 2014. A project was also implemented for monitoring decorative distemper painted surfaces.

Most of the decorative distemper paintwork which was treated in the Stave Church Preservation Programme is from the 1600s and 1700s. Such artwork is typically dominated by tendrils and vines and often covered the entire church interior. These were inspired by sources other than contemporary easel paintings and comprise motifs that are most often associated with distemper decorative painting. The emphasis of this chapter will be on distemper decorative painting from this period.

I will offer some insights on several themes associated with distemper decorative painting in the churches. No historical sources are known that give definitive reasons for the choice of distemper paint for the decorative



Kvernes stave church. Nave seen towards the west with the priest's family pew on the south side of the nave. The back wall of the pew has an imitation two-tone Ikat weaving, painted in distemper in the middle of the 1700s. The church interior was decorated in 1633, according to an inscription on a memorial on the north wall of the nave. The grey vines on a red ground with details in black, white and yellow cover the walls and ceiling and dominate the large, open interior: Photo: Jiri Havran, date unknown.

painting. However, there are painter's manuals from as far back as the 1600s which describe distemper paint, and this article will suggest why this type of paint was selected. I will discuss practical considerations and costs linked to the task of painting in the churches based on information taken from church account books, or ledgers. Light will be shed on the condition of the distemper painting, the changes and the treatment history, and current treatment methods will be presented.

Research on distemper decorative painting from the 1600s and 1700s is still in its infancy. Many questions remain unanswered. What were they modelled on? Where in Europe do we find comparable decoration? What does the choice of décor reveal about contemporary society and the Church? Which pigments, and in particular, which volatile pigments or dyes, were used?

And last but not least: how can we best preserve the paint?

Greater knowledge about distemper decorative painting, the optimal indoor climate for each painting and empirically-proven conservation methods will all enhance the conservation conditions for the artwork. The history of distemper decorative painting and its significance for church interiors are factors calling for treatment characterised by care and respect.

Changing views of the value of distemper painting

We now view distemper decorative painting, whether it belonged to the original stave church or is part of the church's history of refurbishments, as a vital element of



Borgund stave church. Good lighting reveals traces of decorative distemper painting in a number of places in the washed church interior. Here fragments of vine decoration can be seen up on the wall in the south-east corner of the nave. The colours in the wood show the direction of the vines. Photo: Tone Marie Olstad 2015.

the church interior which deserves preservation. It has not always been this way. In Hopperstad stave church, as at Borgund, decorative distemper painting from the 1600s covered large parts of the church interior until it was washed off in connection with restoration work in the years 1885–1891.⁵

In a letter from the Society for Preservation of Ancient Norwegian Monuments in 1888 to the architect Peter A. Blix, who was in charge of the restoration, the “cleaning of the upper walls and pillars from subsequent painting, [...]” was mentioned as one of several priorities for that year.⁶ Blix was subsequently dissatisfied with the result: “We had hired a few washerwomen and local carpenters to scrape off and wash away all the interior paint on the walls, pillars etc. because the painting were from a later time. This gang has carried out its job so thoroughly, that unfortunately all the old Romanesque and Gothic paintings were lost in the wash [...]”⁷

Medieval decorative painting, rather than post-Reformation painting, was valued more highly by Blix and his contemporaries. Were cultural historians and art historians from the late 1800s, and on into the 1900s, interested in distemper painting in general, or were they, like Blix, more concerned about the original painting in the stave churches?



Hopperstad stave church. Like Borgund, the decorative distemper painting in Hopperstad was washed off at the end of the 1800s as part of the restoration of the church. Fragments of the painting can be seen in a number of places in the church. Here the wall painting has been preserved in the south-west corner of the nave. The decoration is best preserved on the back of the door which was probably missed when the church interior was washed, and this has preserved the painting. Painted draperies lower on the wall, «landscape» with trees and building above the draperies. The decoration above the draperies resembles the decoration in the nave of Flåm church, but the painted decoration in Flåm church was added somewhat later. Photo: Iver Schonhowd 2003.

In *Norges malerkunst i middelalderen (Norwegian painting in the Middle Ages)* from 1917, Harry Fett describes the decorative distemper painting in the church interior. He describes it as rural art that “functions according to purely decorative views” and lacks the precise style of the altar frontals. At the same time, he praises the method that was used to create a painting which would be experienced in large format, and as part of a dark, and partly closed church interior.⁸

Fett’s publication from 1911, *Norges Kirker i det 16de og 17de Aarhundrede (Norway’s churches in the sixteenth and seventeenth centuries)*, features on its first page a watercolour of the post-Reformation distemper paint decoration interior of Årdal Church in Ryfylke.⁹ The main part of what Fett relates about the post-Reformation distemper decorative painting is quoted from the art historian Anders Aubert’s publication following the so-called “Numedal Expedition” in 1901.¹⁰ Fett appears to be less concerned about distemper painting from this period than about the medieval painting. Aubert’s

report from the expedition to Numedal, less than 20 years after the décor at Hopperstad stave church had been scrubbed off, discusses distemper painting in Nore and Uvdal stave churches.¹¹

The expedition values the distemper decorative painting as a tool for the relative dating of elements in the stave church structure, while Aubert is also interested in this decorative art in its own right.¹² He links the design of the painting to its contemporary form of expression, and expresses admiration for the skills of the painter. “Oil paint is used in Opdal’s church, while in Nore some type of distemper paint [is used]”, he writes, quite correctly, about the décor from the early 1700s in these churches.¹³ He describes the first church decoration from circa the mid-1600s as “watercolours containing chalk”.¹⁴ Aubert views the decoration as an imitation of costlier materials, textiles, Gobelin tapestries, and gilded leather wall coverings: “The painting was like a poor, makeshift standby instead of the magnificent and costly materials that embellished the homes of the wealthy abroad.”¹⁵ On the other hand, he is interested in the decorative paintwork as paintings modelled on European originals, and as a forerunner to, and part of, Norwegian folk art painting.¹⁶

Like Aubert, the Norwegian painter Gerhard Munthe was fascinated by colours and their effects, and by objects deemed to be “National”. Appreciation of anything quintessentially Norwegian was a trend in the years leading up to, and around, Norway’s dissolution of the Union with Sweden in 1905.¹⁷ Munthe writes: “The scrolls around the walls and on the heads of the church’s posts are not essentially different from the tapestries and rose paintings, with regard to the appearance of the colour’s decorative powers.”¹⁸ Munthe’s statement, and his contact with Aubert, would seem to indicate that the decorative painting in the churches was known and, together with the churches, it had a certain meaning for artists in a period when the stave churches had been endangered by legal regulations regarding church dimensions, and by restorations.¹⁹

In *Norsk Kunsthistorie (The History of Norwegian Art)* from 1925, Carl W. Schnitler includes the post-Reformation decorative wall painting and distemper artwork in the churches in a chapter about sculpture and painting in the 16th and 17th centuries. He names several churches with decorative painting but devotes most attention to the décor in the Numedal churches.²⁰

Einar Lexow’s *Norges kunst (Norway’s Art)* from 1926, briefly mentions the decorative painting, whereas in Henrik Grevenor’s *Norsk Malerkunst under Renaissance og Barokk (Norwegian painting during the Renaissance and the Baroque period)* from 1927 there is a chapter on *Dekorativ maling og Kirkestaffering (Decorative painting and church adornment)*.²¹ What Grevenor writes about the painting in the churches appears to be largely based on Aubert’s and Nicolaysen’s previous publications, apart from his idea of a stylistic association between a lost distemper decorative painting at Huseby Farm in Stange, the décor in Borgestuen in Gjerpen, and the distemper decorative painting from 1649 in Eidsborg stave church.²² In my view, these associations are not so obvious. Schnitler and Grevenor generally discuss the same decoration. One might query how many of these they actually saw with their own eyes. Nevertheless, it is interesting that distemper painting is included when they write about art and handicrafts.

In 1938, the art historian Agnethe Mohn dealt with post-Reformation distemper painting as a separate theme in a publication.²³ Starting with the cities of Bergen and Stavanger, she provides an overview of decorative painting from the period 1650–1750 on the west coast of Norway. Mohn makes no distinction between the painting in stone churches and in churches built of wood, when she says “[...] nearly all our painted décor from the Renaissance and Baroque period is painted in watercolours mixed with glue as a binder [...]”.²⁴ Mohn too is interested in connections between the paintings, and links, for example, the oldest painting from 1604 in Eidsborg stave church to the decorative painting in Dale Church in Luster.²⁵

Mohn refers to Domenico Erdmann, a painter and the Directorate for Cultural Heritage’s first restoration consultant, as the most important champion of distemper painting in the first half of the 1900s. Erdmann was a restoration consultant from 1918 to 1940, but also before that, he was the person to whom the Director General of the Directorate for Cultural Heritage, Harry Fett, gave responsibility for the practical implementation of stave church restoration projects.²⁶ In the churches where Erdmann worked, the distemper decorative painting is described in reports, now to be found in the archives of the Directorate for Cultural Heritage and in *Norsk dekorativ maling fra reformasjonen til romantikken (Norwegian decorative painting from the*



Torpo stave church. Painting from the 1200s on the baldachin. Detail from the story of St. Margaret. The motif is painted on a white ground in a thin, black colour before the main colours in each area are added. Then the details are applied. Finally the black contours are painted in. Note how the brush marks define the face of the figure on the left. High humidity, fluctuations in humidity and possibly previous consolidation work has worn away the painting so that the wooden structure can be seen. The colours are generally best preserved where there are several layers of paint. Where paint is missing on the joint between the plates, there was originally a canvas strip covering the joint. The black lines above the joint are secondary additions, probably from the treatment in the 1930s. Photo: Birger Lindstad 2009

Reformation to the Age of Romanticism).²⁷ The restoration consultants, who succeeded Domenico Erdmann, evaluated and prioritised distemper decorative painting in the churches on a par with other church art.²⁸ Restorations of rebuilt stave churches from the 1930s to the 1960s often meant a return to the post-Reformation stave church, and included treatment of any distemper paintings to preserve them and to improve visibility. Up until the mid-1970s this treatment could include the time-consuming and complicated removal of layers of overpainting to reveal the distemper décor.²⁹ The restoration consultants and conservators have naturally adopted a more practical approach to distemper decorative painting, and perhaps for this reason have been more concerned about post-Reformation decorative distemper painting in the church interior than art historians have been. From the mid-1950s, the art his-



Ål stave church museum. The walls in Ål stave church. Detail of figure in painting from the 1200s. The motif is etched into the wood before a white ground is applied. The etching can clearly be seen on the hand towards the bottom of the picture. Then the main colours are applied before the details and contours are added. Unlike the painting in Torpo, the contours of the face and hair are applied using a brown colour. Photo: Arve Kjersheim 1997.

torians Sigrid Christie and Anne Marta Hoff have *seen* and described many of the stave church's distemper decorations in their contribution to the publication *Norges Kirker (Norway's Churches)*.³⁰

Available literature shows that post-Reformation distemper painting became a subject matter from the beginning of the 1900s. This was probably a result of the Numedal Expedition in 1901 and Aubert's commitment afterwards, which spread interest in post-Reformation distemper painting amongst art historians, thus contributing to the appreciation of these later additions as important elements in stave church interiors.



Urnes stave church. Detail from the vine decoration from 1601 on the north wall. The decoration is drawn on a thin, white ground with a silver-coloured hard pen which can be seen in the upper-right of the picture. Then the coloured areas are painted: blue, red and a yellow-red. Finally the black contours are painted which define the motif. As is the case here, there is often little correspondence between the sketch and the final contours. The sketch appears to have been done to place the motif on the wall. This could be interpreted as the painter knowing the motif he wants to paint, or that he has a model. Photo: Tone Marie Olstad 2011.

Distemper painting: techniques and materials

Distemper is a water-based paint made from pigment with animal glue as its main binder. Analyses of 1600s paintings have revealed the addition of casein, egg and oil to the glue.³¹ The types of glue, and other possible ingredients in the binder, probably varied according to what was available, and particularly what the individual painter preferred to use, whether in the Middle Ages or after the Reformation.

A medieval painting is assessed visually to be made with distemper when the surface is matt, the paint is water-soluble and it has a different character to that of medieval paintings done in oils. Analyses have not been made of the binder compound in the distemper decorative paintings from the Middle Ages in Norwegian churches, but analyses of distemper dated prior to 1323 in the burned-down Södra Råda Old Church in Sweden showed the binder to be animal glue or casein.³²

The binder limits the extended use of moulding, or wet-on-wet mixing of colours. The distemper's limitations probably contribute to the characteristic trait of the decoration: elements painted in monochrome fields of colour contoured with contrasting colours. The pro-

portion of binder and pigment in the distemper has to be correct for the paint to produce the desired coating effect, so that it neither runs down the wall while wet, nor rubs off after drying.

The décor is painted on the wall from the top, so that any drips can be covered up.³³ The different pigments may require different proportions of binder. If the mix of glue is too concentrated the paint layer can come away from the base, either immediately or after drying, or after years of impact from fluctuating climatic conditions, as has been observed in the 1700s decoration in Nore stave church.³⁴

In general, painting with distemper requires technical finesse and a steady hand when applying the decorative coat, as the brush needs to move quickly enough to avoid dissolving the base coat. It is almost impossible to correct errors without these showing. The painters have generally worked with cold colours on an evenly-absorbent base, but areas have been observed in some post-Reformation décor where air bubbles have formed in the paint. This could mean that the paint was warm when applied, as recommended in contemporary manuals.³⁵ It does not seem as though painters put much effort in preparing the surface of the wood which was to be painted. Such surfaces were finished in the same way as unpainted surfaces, and tool marks can often be seen through the painted surface where the distemper has worn off or was thinly applied.

The Torpo church decorative distemper paint from the 1200s can serve as an example of medieval painting techniques. The painter at Torpo began by applying a white paint layer. After it dried, the motifs were then drawn onto this white ground with diluted black paint. No signs of supplementary sketched or etched guiding lines for the motif have been found. The colours were filled in between the black lines. The density and structure varies from the opaque to just a thin glaze of paint. Colour shading is done both wet-on-wet and as a separate layer on dried paint. Finally, the contours were added.³⁶ In the contemporaneous paintings from Ål stave church, the motifs were etched onto the planks before the paint was applied. Here too, the colours were painted onto a thin white paint layer.³⁷

Post-Reformation distemper décor is generally made by spreading the colours onto the surface of the dry, usually white background. First, the distinct local colours of the elements are painted, then any shadowing

Table 1. Stave churches with medieval distemper decorative paintings

Stave church	County	Dating of decoration	Surviving in situ	Treated during the Stave Church Programme
Torpo	Buskerud	1250–1300	Lectorium ceiling and backdrop wall on the east	2007–2009
Rollag	Buskerud	1200–1300	Part of covered decoration on chancel wall's lower wall plate	
Nore	Buskerud	1200–1300	Fragment above today's ceiling	
Heddal	Telemark	1200–1300	Wall paintings on chancel and nave, overpainted.	2008 – 2009
Hopperstad	Sogn og Fjordane	1200–1300	Fragments on pillars in the chancel. Canopy over north altar	
Hedalen	Oppland	Medieval	Fragments east in the west nave	2008
Høyjord	Vestfold	Medieval	Fragmental – partly overpainted and reconstructed in the 1950s	

Table 1. References to the dating in the table are given in the text below, where the paintings are described. Surviving distemper paintings preserved in museums from existing and lost stave churches are not included in the table. Objects held in museums include paintings from the following stave churches: Høyjord Stave Church, fragments. In Vestfold Museum, Tønsberg. Lårdal Stave Church (demolished), fragments. In Vest-Telemark Museum, Eidsborg. Ål Stave Church (demolished), much of the chancel. In the Museum of Cultural History, Oslo and in Ål Stave Church Museum, Ål. Nore Stave Church, fragment (uncertain whether this is part of an interior painting). In the Museum of Cultural History, Oslo. For further information about decorated stave church elements in Norwegian museums, see Wickstrøm 1981 and Hauglid 1973. Fett also discusses loose wooden elements with decorative distemper paint from Røldal Church. Fett 1917, p. 47

or colours that add shape, and finally the contours. Colour details can be added after the contouring.

It appears as though two parallel, rational principles have been followed. The local colour is painted prior to the shape-defining and contour colours. Everything in the same area of the same colour is painted simultaneously; for instance as long as the painter had some yellow on his brush, he used it everywhere it was needed, as far as he could reach. The details in the depiction of figures are sometimes painted wet-on-wet and some times they almost resemble an oil painting technique. The surface may have been saturated with glue before the first paint layer was applied.³⁸ A sketch on the first layer of paint, and the use of a compass and etched lines have been observed in several of the the distemper paintings from the 1600s.³⁹

Distemper decorative painting from the Middle Ages

Interior paintings from the Middle Ages have survived at Torpo, Rollag, Nore, Hopperstad, Hedalen, Heddal and the Høyjord stave churches. Only the décor at Torpo can be seen by the general public. Apart from Hedalen and Torpo stave churches, these churches also have post-Reformation distemper paint decoration (see table 2).

The medieval distemper interior paintings on wood are figurative and decorative with repeating patterns or borders. The décor may have been limited to parts of the church interior, often the chancel. Put simply, one might say that the pre-Reformation church interior paintings

mirrors the expression found in contemporary paintings in smaller formats, for example the altar frontals.⁴⁰

In many ways, the painting in the interiors, the wall and ceiling decoration, can be seen as an enlarged, coarser version of a panel painting: the format and materials differ but the motifs and the composition of the paintings have many similarities. However, Professor Unn Plahter, by comparing the modelling of the faces of the altar frontal at Heddal (oil paint) and on the ceiling at Torpo (distemper), points out that the oil painting of the 1200s has a softer shading than the distemper painting.⁴¹ The painting technique and format resulted in different expressions, even where the motifs might be the same.

Surviving medieval decorative paintings in the stave churches are, with the exception of Torpo, fragmental, and are a mixture of the figurative and decorative.⁴² In the chancel at Rollag, a narrow strip of quatrefoils in a rhombic network is preserved on the wall plate. From a stylistic point of view, it remains uncertain whether this is a medieval or a later painting which is based on a medieval decorative scheme.⁴³ The decoration at Rollag could be a border, like the one found at the Slidredomen stone church in Valdres, or it could be part of a of quatrefoils in rhombuses pattern which covered large areas of the original interior as at Torpo. A semi-circular field of quatrefoils in rhombuses has also survived in Nore above the current ceiling on the wall plate of the eastern wall of the nave.⁴⁴ The main part of the painting is missing.

Remnants of overpainted medieval paintings are found in the chancel and nave of Heddal stave church.⁴⁵ Multi-coloured painted draperies decorated the lower



Torpo stave church. The baldachin and back wall have decorative distemper painting from the middle of the 1200s. This is the best-preserved medieval painting in the stave churches, and the one that best conveys the experience the decorated interior leaves. Photo: Birger Lindstad 2011.

part of the wall. The draperies and frieze high on the wall are divided by a border of red tendrils on a white base. Inspections with infrared light have made it possible to see elements of the overpainted medieval painting, and to discover that these decorative elements share many similarities with other medieval distemper décor in Norway.⁴⁶ On the chancel walls there may be two layers of medieval decoration largely concealed behind the painted distemper décor from the 1600s.⁴⁷

The art historian Robert Kloster writes about the painting on the chancel pillars in Hopperstad: “On



Hopperstad stave church. Painted distemper decoration dated to the end of the 1200s on one of the staves in the chancel. Only fragments of the medieval painting have been preserved. The architect Peter Blix, who recorded the figures on the two pillars in the chancel, describes one figure as St. Paul and the other as St. Peter. Photo: Birger Lindstad 1993.

the flanking chancel pillars one can see traces of painted saintly figures which must have been done by a fully-experienced ‘pintare’ in the late 1200s.”⁴⁸ One of the figures is relatively well-preserved.⁴⁹

A medieval ciborium, or canopy, stands above the northern altar in the front of the nave. The underside of its ceiling and rear wall are decorated, probably in distemper, and partly on canvas. The art historian Roar Hauglid dates the painting on the lower side of the ceiling to circa 1300, but the dating is uncertain. This uncertainty is confirmed by painting conservators who have evaluated the paintings.⁵¹ The rest of the ciborium construction has preserved fragments and traces of paint.⁵¹

In the original southern side-altar niche of Hedalen Stave Church, now east in today’s west nave, we find fragments of a painted figure holding a book and clad in a red tunic.⁵² Remnants of paint have also been found that could be medieval decoration in what would have been the northern side-altar niche in the church from the Middle Ages.⁵³

Only fragments of the medieval decorative painting are to be found in Høyjord stave church.⁵⁴ The resto-

ration consultant Finn Krafft writes: “When restoring Høyjord Church, which was completed in 1952, the decorative painting on the new vaulted chancel ceiling, as well as on parts of the south and north walls, were reconstructed and painted on the basis of the surviving remainders of the medieval painting on the original stave church elements.” Both what Krafft found, and his comprehensive reconstruction, are well-documented.⁵⁵

The baldachin with its distemper decorative paintings in Torpo stave church has, along with the painted back wall, a monumental impact on the church interior. This is the surviving medieval painting in the stave churches which best imparts the experience of the decorative painting of the interiors. The painting on the ceiling over the former lectorium is comprised of three motifs: Judgement Day with Christ placed in the centre, then the apostles, and the legend of Margaret of Antioch lowest on both sides of the ceiling. The crucifixion is painted on the accompanying backdrop wall towards the east. The scene lacks the crucified figure, which was probably a sculpture, but the Virgin Mary and St. John are present against a background of quatrefoils in rhombuses. The victorious Ecclesia and the defeated Synagogue are also depicted.

The antiquarian Anders Bugge says of the painting: “This little series of pictures, which is now only paralleled in the decorated ceiling from Ål stave church (in the University of Oslo’s Museum of Antiquities) is the most important and best-preserved medieval architectural painting to survive here in Norway.”⁵⁶ According to Sigrid Christie, the Torpo painting differs stylistically from the Ål paintings and must have been done by another painter.⁵⁷ The art historian Anne Wickstrøm refers to Magnus Lagabøter’s municipal law of 1276, which regulated the placement of artisans: in Bergen, this included painters. She argues that the larger cities had artistic circles, and painters who decorated the church interiors came from these. She thinks the Torpo painting was probably painted by this type of trained painter.⁵⁸

Surviving medieval decorative painting from, and in these stave churches show that the stave churches probably did have painted décor. We do not know enough to be able to say whether the decoration was a feature of the chancel, as in Ål, Torpo, Høyjord and Hopperstad, or whether it was common for the nave to be decorated as well, as seen in fragments in Heddal and Høyjord. The art historian Eva Weisser-Svendsen

suggests, guardedly, in an analysis of styles that there is a stylistic connection between the figurative and the decorative medieval paintings in Torpo and Heddal. She also links, via the work of earlier art historians, the quatrefoils in rhombuses pattern painted on the east wall of Torpo with the painting that has survived in fragments from Lårdal stave church.⁵⁹ Perhaps future research will find a contextual link for the medieval fragments of quatrefoils in rhombuses painted in Nore stave church as well.

Table 2

Stave church	County	Date of decoration	Treated during the Preservation Programme
Grip	Møre og Romsdal	1621	2003, 2005–2007
Kvernes	Møre og Romsdal	1630s–1640s and 1700s	2011–2013
Rødven	Møre og Romsdal	1640s–1660s	
Urnes	Sogn og Fjordane	1601	2011
Kaupanger	Sogn og Fjordane	1600–1650s	2008, 2009
Undredal	Sogn og Fjordane	1696–98 and 1702–1704	2013
Hopperstad	Sogn og Fjordane	1688	2010
Røldal	Hordaland	Circa 1630	
Flesberg	Buskerud	1650s and 1735	2006–2008
Rollag	Buskerud	1650s, 1683 and early 1700s	
Nore	Buskerud	1655, 1680s and early 1700s	2004–2006
Uvdal	Buskerud	1656 and 1680s	
Gol	Oslo	1652	
Eidsborg	Telemark	1604 and 1649	2007
Heddal	Telemark	1600s	2008–2009
Lom	Oppland	1608	2011
Ringebu	Oppland	1719	2010–2011

Table 2. This table shows the stave churches which still have visible post-Reformation decorative painting in situ. References to the dating of the decoration: Grip⁶⁰, Kvernes⁶¹, Rødven⁶², Urnes⁶³, Kaupanger⁶⁴, Undredal⁶⁵, Hopperstad⁶⁶, Røldal⁶⁷, Flesberg⁶⁸, Rollag⁶⁹, Nore⁷⁰, Uvdal⁷¹, Gol⁷², Eidsborg⁷³, Heddal⁷⁴, Lom⁷⁵, Ringebu⁷⁶.

Post-Reformation distemper decorative painting in the stave churches

The majority of the post-Reformation distemper decorative paintings from the 1600s are evidence of upgrades to the reformed church, and often the wishes of the wealthier members of the congregation to ensure their status for posterity by praising God and donating something to the general public.⁷⁷ The 1600s distemper painting in the church usually includes draperies on the



Kvernes stave church. Left part of the south wall of the chancel. The 1600s decoration which tells a story in pictures with biblical motifs at two levels, has been later whitewashed and then uncovered again. Large parts of the decoration have been lost. What has been preserved has been disfigured by damage, mis-colouring and traces of whitewash. The decoration is almost illegible. The «Kiss of Judas» is one of the motifs that can be seen. Photo: Birger Lindstad 2013.



Kvernes stave church. Left part of the south wall in the chancel. Detail. In spite of damage and traces of whitewash, the detail from the «Kiss of Judas» shows the high quality of the decoration. Only the decoration in Oppdal church is comparable in terms of quality. Photo: Birger Lindstad 2013.

lower half and tendrils and plant ornamentation on the upper part of the wall, often on the ceiling as well, or on structural elements. The tendrils and plant ornamentation dominates the impression of the décor, but several of the 1600s decorations also include figurative depictions, as for example the paintings in the Numedal churches, and in Lom, Eidsborg and Grip.

Landscape is portrayed in some instances, as at Urnes and Hopperstad. The fragmented 1600s picture narrative with biblical motifs in two levels of the chancel in Kvernes stave church is unparalleled in Norway today, even though the apostles in Oppdal Church are of an equally high quality.⁷⁸

Visible distemper decoration from the 1700s is found in four of the stave churches: Ringeby, Nore, Undredal and Kvernes.⁷⁹ Apart from Ringeby, the 1700s décor was only painted on new additions to the church building and stands alongside the decorative paint from the 1600s. The tendrils and plant ornamentation as well as

the textile imitations continue in the 1700s; new are the rebus paintings in Nore and the unique drapery imitations in Ringeby. The majority of the 1600s and 1700s distemper paint is painted on a white ground which is a visible part of the décor. The colours of the décor are dominated by black, grey, red and yellow, but the palette was originally richer.

Research stretching far beyond the bounds of this chapter would be needed to find the source or parallels of the distemper decorative painting as expressed in Norway in the 1600s and 1700s. It was most probably painters from the Continent who brought the models for the paintings to Norway.⁸⁰ How impulses from abroad influenced Norwegian distemper painting is a basis for future studies.⁸¹

The Danish building archaeologist Reinhold Mejborg writes in *Gamle Danske hjem (Old Danish houses)* about the interior furnishing and décor in country estates and other buildings. He advances the theory that decorative wall paint, divided into panels as we for example see in Nore and Uvdal, could be linked to the way half-

timbered house interiors were painted: dark woodwork with light panels, often with decorative paint on the plastered areas. He also mentions Rygaard Manor on the Danish island of Fyn, where the lower part of the wall is painted to look like carved panelling or dado, probably in the 1500s.⁸² This too is a decorative element that we find in the decorative painting of the stave churches in Numedal, where the lower part of the wall is an imitation dado consisting of round-arched Renaissance panels with decorative wooden frames.

The medieval custom of covering walls with hung materials, or draperies, continued into the 1600s in Denmark. The periods with textile draperies and painted draperies overlap one another: Holckenhavn Palace on Fyn had painted red draperies on the wall in many of its rooms in the early 1600s.⁸³ Painted draperies were also found in secular buildings in Norway in the 1600s, for example in the main building of Vøyen Farm in Bærum and at Bolstad Farm⁸⁴ in Ringsaker. In the stave churches, the painted draperies are seen on the lower part of the wall in many variations and colours, such as at Grip, Hopperstad, in the chancel of Kvernes, in Undredal, Nore and Røldal.

Which pigments were used by the painter, and do we still see the colours he painted? The Stave Church Preservation Programme has raised awareness about the difference between the original colours of the decoration and what we see today. However, in order to understand which colours have changed or disappeared, knowledge is needed about painting techniques, pigments and the colours that were available at the time. The most important written source about the 1600s pigments and binders in Norway is Valentinus Bolten aff Rusach's collection of recipes from 1684.⁸⁵

Another often-used source of information is the accounts from King Christian IV's Colour Chamber.⁸⁶ We can find out what the painter used and how he painted, and to some extent we can reproduce the use of colours and the brushstrokes. Nonetheless, we will never completely understand what the original, freshly-applied painting looked like, and any prospective reconstructions will be interpretations based on current knowledge.

It is not a given that all the materials which were available according to written sources would have been

used. Information about materials and the way they were utilised, has to be gathered from each individual painting that is studied.

Table 3. Table of pigments found to date in decorative distemper painting

Colour	Pigment	Durability	Medieval decoration	1600s–1700s decoration
White	Chalk	Stable	V	A
Yellow	Orpiment	Fades	V	A
	Yellow ochre/ iron oxide	Stable	V	A
Red	Red ochre/ Iron oxide	Stable	V	A
	Red lead/ minimum	Stable	A	
	Cinnabar	Stable	V	A
	Common madder	Fades/ changes	V	
Blue	Azurite	Relatively stable	V	
	Indigo	Fades		A
	Smalt	Stable		A
Green	Copper-based green	Unstable	V	
Black	Charcoal black	Stable	V	A
	Bone char	Stable	A	A

Table 3. Pigments found through analysis are marked A. Pigments that are visually evaluated, not analysed, are marked V.

The conservators' knowledge, experience and observations when treating the paintings are important for working out how the painter painted and what he used. Only a limited number of analyses have been made so far, and these cannot supply all the answers, especially with regard to the pigments or dyes which have changed completely or faded away. The table below shows which pigments have been found to date in distemper paint decoration.⁸⁷ In the 1600s and 1700s décor, the pigments are often found in mixtures; green for instance is found as ochre mixed with indigo.⁸⁸

The art historian Agnete Mohn describes the wall decoration from 1601 in Urnes thus: "[...] the painting appears surprisingly sharp and clear. Perhaps because the light has not been able to fade the original colours much, [...] both the drawing and the colours emerge strongly from the white chalk ground. The black contours are the most important part of the decoration,



Urnes stave church. Detail from the vine decoration from 1601 on the west wall. The painter has used vines, leaves and fruit typical of the 1600s. Note the pattern sketches which have only been partly followed. Today the painted vine decoration in Urnes is dominated by black, white and red, but traces of colour can be seen upon closer inspection. Photo: Tone Marie Olstad 2011.



Urnes stavkirke. Same detail from the vine decoration from 1601, but with reconstructed colours. The reconstruction is the author's interpretation of what the decoration may have looked like, based on observations of details in the decoration. More time for assessment and analysis of the faded colours could alter the reconstruction. Photo/reconstruction: Tone Marie Olstad 2011.



Urnes stavkirke. Part of ceiling with decoration from 1601. The ceiling is divided into fields with a large, round flower in each field. The circles are etched into the wood. The background motif, the red, wavy, parallel lines can be seen in a number of decorated interiors, for example in Kaupanger and in Grip. The painted decoration seems to have four colours: red, grey, white and black. Photo: Birger Lindstad 2011.



Urnes stave church. Section of figure 15. The section is from the innermost circle in the flower: On a thin white ground, we can see two red stripes from the petals in the middle circle, short, black brush strokes that create the «stamens» in the innermost circle, etched into the wood to mark the circle which has been drawn in black. Inside this circle, in the left half of the picture, are granules of yellow pigment lying on top of the black colour. This is auripigment, a yellow pigment which fades, but which can be recognised by the large, angular pigment particles. The centres of the flowers were originally yellow. Photo: Tone Marie Olstad 2011.



The church painter very probably had a pattern as a starting point for the decoration. One autumn day in Ephesus I suddenly came face-to-face with Urnes! The motif from the decoration in the gable end in the Temple of Hadrian (100-500 AD) in Ephesus in Turkey – uppermost in the picture – may have made its way across time and space before ending up as a pattern for the Urnes painter in 1601. In the lower half of the picture, the east wall at Urnes. This motif is hidden by the altarpiece, installed at a later point in time. Photo (top): © José Luiz Bernardes Ribeiro 2011. Photo (bottom): Birger Lindstad 2011.



Nore stave church. Northern cross-arm. East wall. A picture bible published in Copenhagen in 1710 was the pattern for the rebus paintings in about 1731. These two show: «Book of Solomon, chapter 2, v.2. Make your ear (figurative) attentive to wisdom and incline your heart (figured). Then you will understand the fear of the Lord and find the knowledge of God» and «Psalm 113, v 3. From the rising of the sun (figurative) unto the going down of the same the LORD's name is to be praised. As long as the Sun shall rise, glory shall be to the Lord». (Text adapted from Christie & Christie 1981–93). Photo: Birger Lindstad and Joppe Christensen 1994.

but the Renaissance's typical colours of reddish brown and yellow are used [...].⁸⁹

I have observed faded greens, yellows and purple colour areas in the wall painting, in addition to the colours mentioned by Mohn. The faded areas were very probably painted using organic pigments. Yellow pigment has been observed on the ceiling of Urnes, which has been deemed to be orpiment, in the centre parts of the large flowers in the decorative painting (which are now white).⁹⁰

The painting technique and the changes in the medieval painting in Torpo appear to share similarities with the painting in the now burned-down Södra Råda Old Church in Sweden, which is dated to earlier than 1323. Looking at the Torpo painted décor in ultraviolet light, confirms what can be glimpsed in normal light; the

halos and other details have had a coat of paint which is now nearly lost. A faded yellow glaze is found on the paintings in Södra Råda, for example on the haloes. The glaze described as “guldfarge” [gold colour], has been analysed and is an organic yellow colour.⁹¹

It would be interesting to analyse the faded yellow colour in Torpo to see whether this is the same “guldfarge” as in Södra Råda. The use of chalk in the ground layer, together with relatively high humidity, has caused damage to the blue and green areas in Södra Råda.⁹² In 1957, the paint conservator Bjørn Kaland also described the green and blue areas in the Torpo painting as being the most damaged. Perhaps the causes of this deterioration at Torpo and Södra Råda are the same.⁹³



Uvdal stave church. North-eastern part of the nave with the Numedal painter's decorative distemper painting from 1656. Note the decoration on the ceiling and the elements in the decoration on the walls. The same elements are to be found in the other stave churches in Numedal, and in Gol stave church. The painted parapet consisting of round-arched panels with decorative frame wood can be seen in the revealed decoration in Flesberg. Photo Birger Lindstad 1993.



Nore stave church. Detail from the Numedal painter's decoration from 1655. The decorative elements and how they have been portrayed and painted are recognisable in the Numedal churches. Typical of the Numedal painter are the lacy leaves. Here they are grey, but originally they would have been green. Photo: Kristin Solberg 1997.



Rollag stave church. The Numedal painter's decoration from 1655. Detail of the decoration on one of the surviving tiles stored at the vicarage. Grapes, leaves and fruit are painted, as at Nore and Uvdal. Note the leaves. Here the green colour has survived. The blue colour, which is indigo, has also survived. This is because the decoration has been kept in the dark. Photo: Kristin Solberg 1997.

Painters and “decorative painters” in the 1600s and 1700s – who painted the churches?

In the 1600s and 1700s it was very rare for Norwegian painters to travel abroad as part of their education, but many of the active painters in this time in Norway were of foreign birth. Grevenor expresses it as follows: “In artistic respects, Norway has always been the recipient country, never the donor.”⁹⁴

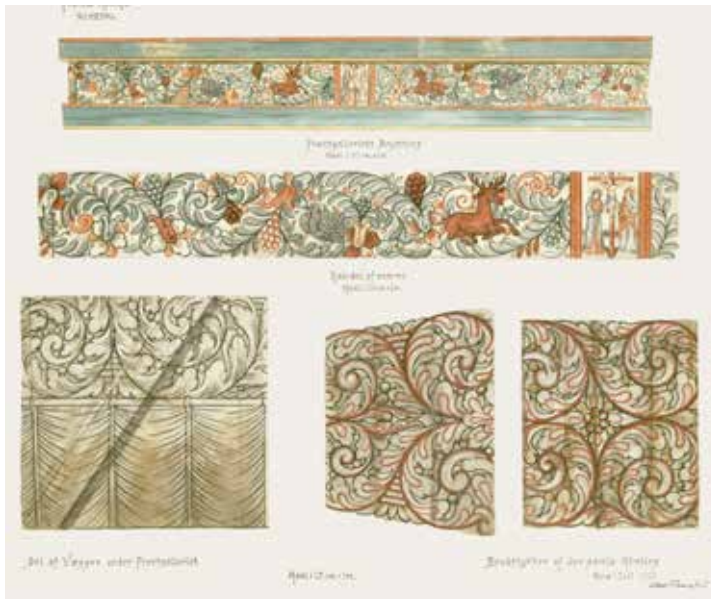
Norwegian painters had no guild in the 1600s; the first was established in Bergen in 1743. Painters in Norway at this time were considered to be craftsmen and probably received their training from an older master without this being part of a system, as it was in countries with painters' guilds.⁹⁵ Schnitler emphasises the importance of immigrant artisans for the establishment of what he calls “local painting schools with characteristics and coherence and considerable output over the course of a lengthy period” in the Stavanger area from the beginning of the 1600s.⁹⁶

Such a community of artists would probably have an impact on the distemper paint decoration in the churches in the region, as the painters were linked to cities and travelled about the country on various assignments.⁹⁷ Being a “church painter” would seldom be a profession in Norway, but it would be part of a painter's work.

Schnitler, Lexow, and Mohn argue that the painters worked with several genres by referring to artists who did several types of work.⁹⁸ Grevenor claims that many painters survived by not overspecialising and accepting a variety of assignments.⁹⁹ Painting with oils and painting with distemper require separate techniques and result in different expressions. This makes it hard to follow an individual painter's style and touch from one technique to the other.

It seems reasonable to assume that the church painters had models for the decorative paintings, although very few have been found to date. The use of models was common in the Middle Ages and has been proven for small-format church art in the 1600s and 1700s.¹⁰⁰ The construction of the tendril motifs on the east wall of Urnes stave church, where a central figure stands and holds the tendrils that cover the wall, is very similar to the decoration of the gable area of the Temple of Hadrian (100–500 AD) in Ephesus, Turkey. One can only speculate how this motif ended up among the models used by the Urnes painter.¹⁰¹ The rebus paintings in Nore stave church from ca. 1731 are painted on the basis of an illustrated bible published in Copenhagen in 1710.¹⁰²

Several painters from the 1600s and 1700s are mentioned by Schnitler, Grevenor, Mohn and Erdmann,



Documentation of the Numedal master's decorative painting in Nore stave church in the form of watercolours. The artist Albert Tønnesen took part in the «Numedal expedition» in 1901 and painted watercolours as a precise record of the decoration in the church. The bottom right shows the decoration on the ceiling in Nore from 1655. Note the similarity between this and the ceiling decoration in Rollag (see ill. to the right). The front of the west gallery is painted at the top. The elements in the vine decoration can be found in the other Numedal churches. The pelican is also found in Uvdal stave church. The vine decoration above the draperies to the left is very similar to the ceiling decoration in Uvdal (see p. 82).

but none of the stave churches paintings are signed. Nor are they attributed in the church ledgers to any named painter. It appears as if the art historians often, on the basis of style, attribute the decorative paintings to painters who geographically or chronologically could have done the work. For instance, Grevenor and Schnitler attribute 1600s ecclesiastical and secular decorative art in eastern Norway to the circle of craftsmen who worked on Akershus Castle in Oslo, where large amounts of work were underway in the first half of the 1600s.¹⁰³

The painter Gottfried Hendtzschel, originally from the German city of Breslau, was important in the Stavanger area.¹⁰⁴ Hendtzschel signed the central painting in the triptych in Røldal stave church in 1629. According to Schnitler, he is almost certainly responsible for the painting in the chancel of Røldal Church.¹⁰⁵ Erdmann and Mohn support Schnitler's attribution



Among the roof boards in Rollag church are many with decoration. These are in the loft, but can be seen if you stand by the wall outside and look up under the edge of the roof. The re-used boards were painted by the Numedal master. The ceiling decoration from the 1650s was the same in Nore and Rollag stave churches and is very similar to Uvdal. Photo: Tone Marie Olstad 2015.

and Mohn thinks Hendtzschel used the same model for the chancel decoration in Røldal as for a painting in Malmø.¹⁰⁶

With regard to the decorative painting in the Numedal churches and in Gol stave church, examinations by painting conservators support the assumptions of Schnitler, Erdmann and Christie that the painting was done by the same painter, but no name has been found.¹⁰⁷ In addition to a stylistic evaluation, the conservators base their conclusion on similarities in painting technique, brushstrokes and the decomposition of colours. The decorative painting that was added in Uvdal and Nore with the extensions to the churches in the 1680s seem also to have been done by the same hand in both churches.

For the decorative painting in the remaining stave churches, it is hard to find such close similarities as to suggest that paintings in more churches were painted by the same painter. One exception is the tendril motif from the early 1700s on the west wall in the nave of Undredal stave church. The similarity between this and the decorative painting in Holdhus, Jostedal and Flåm churches makes it tempting to attribute the painting to the same painter, namely one "Moses painter", as he was called in Jostedal Church's account books for 1714–1716, when the church interior was decorated.¹⁰⁸

But who this painter was or where he came from remains a mystery.

Domenico Erdmann thinks that a signature with the year 1642 on the back of a pew in the nave in Kvernes is the signature of the decorative painter in Kvernes Church, because he has found the same signature on the pulpit of Tingvoll Church with the year 1652.¹⁰⁹ Erdmann suggest that the painter could be Salomon von Haven or Seth Bogarth.¹¹⁰ Erdmann also thinks the same painter decorated Kvernes and Rødven stave churches.

The 1600s century décor in Rødven shows similarities in the use of colours and brushstrokes to the nave in Kvernes, but the Rødven decorative painting is smaller in dimension and also three-dimensional, and it lacks the use of yellow. As in Kvernes, the red ground of the décor is painted in between the tendrils and does not serve as the entire base.¹¹¹ From a purely stylistic viewpoint, and seen in relation to how the décor has changed, the conservators who worked with the décor in Kvernes and examined Rødven think that it is unlikely that the same painter was at work in both churches. I find it more probable, as Erdmann also says, that there is a connection between the decorative painting in Kvernes and the secular decoration in the so-called Raulåna building in Oppdal.¹¹²

The decorative distemper painting in the churches, probably largely reflects the secular decoration from the same period. Schnitler and Christie mention the now lost decorative painting in Akershus Castle from the mid-1600s, by Adam van Breen and Willem Tordsen, as an example of 1600s secular painting, a type which can now only be seen in the churches.¹¹³ In the oldest part of Rollag Vicarage, the artwork from the Numedal painter is preserved; the same anonymous painter painted the decorative paintings in secular buildings and in the churches.¹¹⁴ The Numedal painter may also have made the decorative distemper décor in the Vikersund building at the Drammen Museum of Art and Cultural History (farmhouse from Østre Vikersund, 1665) and the painting from Tollbodgaten 14, Drammen, also in the museum in Drammen.¹¹⁵

Why paint with distemper?

In the 1200s, the oil painting technique was still too undeveloped for painters to use oils as the binder on

such large surfaces as for example at Torpo and Ål stave churches. The only paint medium available to the medieval, large-format painter would have been a water-based binder. By the 1600s and 1700s, the painter would have a viable choice between distemper and oil paints. However, the size of a painted surface was still crucial for the selection of distemper. Alternatively, distemper may have been chosen because the painter and the client preferred the distemper paint's surface and appearance. I have not found any sources that state the reasons for the painter's choice of binder. It is likely that practical considerations such as cost and availability, and how the binder affects the work process, have determined the choice of binder in this period.

In the 1600s and 1700s linseed oil was a product that could only be bought in the larger cities. This meant that the oil had to be brought to the site, or be delivered, and the painter had to ensure there was enough oil, as the time it would take for orders and deliveries to arrive would delay the process. Oil was more expensive than glue, and the glue for distemper paint could also be produced on the spot. When the interior of Jostedal Church was decorated sometime between 1714 and 1716, the ledgers show that distemper was used and the glue was rendered from 24 calfskins.¹¹⁶

Most post-Reformation distemper decorative paintings are painted on a white or light background. The available white pigments in the 1600s and 1700s were lead white and chalk. Lead white was more expensive than chalk.¹¹⁷ The pigment in a distemper-based white or light coloured paint could consist solely of chalk, or with the main part being chalk, and it could be painted with one or possibly two coats. Unlike lead white, chalk has a low refraction index and does not provide an opaque white when mixed with oil. To make a white or light oil-based paint opaque, the paint must consist mainly of lead white. The difference in price between oil and distemper, and between lead white and chalk, was large enough to make cost alone determine the choice of animal glue as a binder.

There were also other practical reasons for choosing glue. The painter carried what he needed for his work with him. If he were to have a white or light opaque surface as the ground for the decoration, he would need enough oil paint for at least three coats. One litre of linseed oil covers 10 m² to 15 m². At Urnes stave church the decorative painting covers about 30 m².

If the painter had decided to use a linseed oil paint, he would not only have to carry about six litres of oil with him, but also about half that volume of lead white pigment and some chalk as a paint filler, as well as turpentine.¹¹⁸ Oil also extends the drying time and thus the time a job takes. Distemper paint can be painted over after a few hours in dry weather, or the day after. In the best case, with optimal weather conditions, the use of siccative (a drying agent) and a thin coat of paint, oil paint can be painted over on the following day, but two to three days of drying prior to overpainting is usual.

The use of distemper paint gave the painter an opportunity to cover large surfaces without being delayed by long drying times or a lack of binder. He could also use a technique that gave an optimal effect with pigments that in any case tended to be expensive.

What did the commissioned painting cost, and who paid?

Existing church accounts show that the costs of decorating church interiors were often shared between the church and some of the parishioners. In the following I will refer to church accounts where the decorative painting of the church interiors in the 1600s and 1700s are listed as expense items, and where the book-keeping itself, or the surviving decorative paint shows that the outlay was for distemper paint. As the same type of artwork was painted in stave churches and other wooden churches, I have used the information I could find, independent of wooden church type.

Wealthier parishioners or vicars probably commissioned the painting, as the vicar Knud Winther did in Numedal the 1650s, and the vicar of Kvernes did, being the man responsible for having Kvernes and Grip stave churches decorated early in the 1600s.¹¹⁹ The church was probably involved in the decisions about the decorative painting, even if the costs were covered by others.¹²⁰

The parishioners of Hopperstad stave church covered half the costs when their church was decorated in 1687; the rest was covered by the church. No names of the parishioner donors are listed in the account books.¹²¹ In Nore and Gol stave churches, an area with writing in the décor lists the members of the congregation who contributed. The ledgers for Gaupne church 1658–1660 show a cost of eight riksdalers to Niels Maler for painting the interior “[...], and the rest was paid by some

of the best situated parishioners”.¹²² The payments for transport and board and lodging for the painters which are itemised in the church accounts confirm that the church painter was not a local resident.

The ledgers for Årdal church 1661–1663 specify the board and lodging costs for over nine weeks for two painters who “painted the whole church” for funds collected among the farmers.¹²³ Jostedal church’s ledgers reveal outlays for transport and scaffolding when the interior was painted in the early 1700s, but there is no mention of painters’ wages or the costs of paint materials. These could have been paid by others than the church.¹²⁴

The ledgers make no mention of board and lodging costs when the nave of Ringebu church was painted in 1719, so the painter may have been accommodated privately. The costs of the work were also split. The church paid seven riksdalers for the painter’s outlays for “Colours”. The painter’s wages “have been paid by the congregation through the vicar, and some of the men who have taken it upon themselves...”¹²⁵

The church ledgers of 1699–1701 for Fortun stave church show a painter was paid for working in the church for six weeks, receiving 14 riksdalers for painting and decorating the church nave, porch, pews and pulpit. The sum seems to indicate that the church covered the entire costs.¹²⁶ When the interior of Fåvang church was painted in 1755, 43 riksdalers were paid for “colours rough and fine and the required varnishes [...] and 10 riksdalers for “Liim olie” [glue oil] [...]. The congregation paid the cost of materials and the entire parish covered the labour costs. “Corporal Sundsted will paint the church”.¹²⁷ The outlays listed were relatively high. This could mean that expensive pigments were used, and that oil paint was used, probably on other parts of the interior than the walls. This is one of the few church ledgers that states the name of the painter and the only one I have found that says the church interior was to be painted with “Liimfarver”, or distemper paint. Unfortunately, this artwork has not survived, so it is impossible to analyse the use of pigments or any variation in the use of binders.

Church ledgers are fascinating sources of information, but the accounts may be missing for the period when the church was decorated, as is the case for the Numedal churches. The costs paid by parties other than the church were most often not included. It is impossible to arrive at firm conclusions based on the ledgers that have been

transcribed and are easily accessible. However, it looks as if the costs for painting church interiors often were split between members of the parish, that the church covered transport costs, that board and lodging and scaffolding were provided, and that more than one painter could be involved in the painting of the church interior.

The condition of the décor and treatment history

Distemper decorative painting is water-soluble and vulnerable. Because the binder is water-based, the most common cause of damage to distemper painting is moisture or water. Dark stains occur along the outer edges of the patches affected by water and damp and are assumed to be concentrations of glue and dirt, pigment particles and water-soluble extracts from the wood. In the pale, washed-out patches the binder is weak or missing. Fluctuating levels of high relative humidity can lead to the binder becoming weak. Unstable climatic conditions, a common problem in actively-used churches that are heated, lead to blistering and flaking of the paint layer if it is of a certain thickness. Direct contact and unintentional friction against the surface from the clothes of visitors walking by change the surface lustre and appearance, or wear the paint off completely.¹²⁸

Many of the decorative distemper painting in the stave churches are remarkably well-preserved, or else the extent of their damage and changes are accepted as a sign of age. Differences in maintenance, use, climatic conditions and treatment history means however, that the state of preservation, and thus of the experience value of the décor, differs from one church to another.¹²⁹ Much of the décor has an extensive history of preservation treatment. Changes to the church interior, a revised regard for the paintings, or heavy damage have led to overpainting of the decorative paint, often repeatedly. In connection with the numerous comprehensive church restorations from the early 1900s and up until around 1960, much of this overpainted décor has been uncovered and meticulously touched up or reconstructed. Perhaps the initiatives have raised the historic narrative value, but the experience of the art has been substantially undermined.¹³⁰

Grip and Kaupanger stave churches are typical examples where major changes have damaged the decorative distemper paint. Both churches were rebuilt as

neo-Gothic churches and completed in 1865 and 1862 respectively. Windows were added or enlarged; the interiors were changed, including the ceilings, with the decorative paint overpainted or hidden behind panelling. Distemper decorative painting in Grip Church had been painted over several times before being panelled over in the 1800s.¹³¹ When a 1800s panel in Grip Church was removed during restoration in 1932–1935, some of the wall surface had to be spliced. The overpainting of the decorative paint was dissolved with paint remover and washed off with petrol. The remaining decorative fragments were partly retouched, partly overpainted and partly reconstructed.¹³²

Multi-coloured decorative vines dominate the upper parts of the walls in Grip stave church. The remnants of draperies can be seen in the nave: blue, red and black on a yellow ground. On the north wall the five wise and the five foolish virgins are depicted above the draperies. Remains of figurative painting are also found in the chancel.¹³³ The distemper painting in Grip church has not only been subjected to rough treatment, but also to salt damage because of the church's location, about 15 metres above sea level on an island with an area of just 0.48 km². The decorative painting was cleaned and consolidated in the period 2001–2006.¹³⁴ The paint was carefully retouched to increase its legibility but it is still hard to discern. It is very damaged and altered, and it is difficult to make out that this was once a colourful painting. Even after the treatment, the motifs can only really be observed in small areas and it is hard to get a grasp of the decorative painting as a whole.¹³⁵

When Kaupanger stave church was returned to its assumed 1600s state in the 1960s, it was impossible to remove all the layers of decorative overpainting covering the walls of the nave and chancel, as well as on the construction elements in the church interior. Both the nave and chancel had tendril decoration on the upper parts of the walls. Beneath the decorative plant motif in the nave runs a vertical frieze of so-called neumes, a form of musical notation from the Middle Ages.¹³⁶ Higher up the wall, above the arches between the staves or posts, neumes can be spotted through the remaining layer of overpainting, which is like a grey veil over the artwork, reducing the colours and making the motifs in the decorative distemper paint hard to distinguish.¹³⁷ The decoration is no longer experienced as distemper painting, and it is impossible to get an idea of how the



Kaupanger stave church. Part of the south wall with traces of a 1800s window inserted. The secondary inserted material is muted using a grey-white «wash» with oil-based paint. The original colourful decorative distemper painting has been reduced to a weak, almost black and white decoration. Below the vines in the nave is a vertical frieze of neums, a musical notation from the Middle Ages. Photo: Birger Lindstad 2008.

original colourful floral motif decoration on a white ground once dominated the church interior.

Fortunately, some of the decorative distemper painting in the stave churches has been spared from being overpainted and the subsequent paint removal process. Examples include the medieval decorative painting at Torpo, the painting in Uvdal, Nore and Urnes stave churches, the decorative painting of the nave in Kvernes and in Rødven stave church. Rødven is *the only* stave church where none of the decorative distemper painting has been treated. The painting is worn, changed by age and hard to discern, but it is significant for the experience of the church.

“Thanks to the church never being restored, here we encounter one of the very few surviving rural church interiors,” Håkon Christie writes about Rødven stave church in 1969.¹³⁸



Rødven stave church. Decoration painted in the middle of the 1600s. The upper part of the wall is covered with grey, white and black vines on a red ground; the lower part with architectural elements in the same colours. The decoration is very worn and decayed. This is the only decorative distemper painting in the stave churches which has survived in an untouched state. Photo: Tone Marie Olstad 2011.

Investigations and treatment of distemper painting in the Norwegian Stave Church Preservation Programme

The Norwegian Institute of Cultural Heritage Research (NIKU) has conducted research on the indoor climate of churches and climatic impacts on painted church art. In this work, NIKU has identified the need for registration and monitoring alterations in the paint layer in their initial stages, so that action can be taken before loose paint falls off.

As part of the Stave Church Preservation Programme and a Polish-Norwegian European Economic Area co-

operation initiative, NIKU carried out a project in 2008 in Hedalen stave church using speckle techniques to detect early damage in the paint on the altarpiece.¹³⁹ The project yielded results but the method was deemed too complicated and costly for general use.¹⁴⁰ In 2011, a scanning project involving the decorative distemper painting was initiated in Urnes stave church, at the same time as the paintwork was under restoration. The objective was to document the surface topography of the decoration. If it were possible to detect a difference in the surface before and after treatment, the scanning process could be used as a tool for monitoring distemper painted surfaces.

Two scanning methods based on reflected light were used on selected areas of the painting: optical scanning (scanning with structured light) and scanning with a surface profilometer.¹⁴¹ The optical scan provided a very good description of the surface of the chosen areas, regardless of conservation condition. A comparison with the scanning results before and after treatment showed that a change in the surface occurred because of conservation (adhesion of loose paint). In the areas that had only been cleaned, it was hard to see a clear difference between the before and after scans of the surface.

Technical limitations of optical scanning made it impossible to compare numerical results with certainty at the resolution we wanted from two subsequent scans. As scanning equipment and methods are being continually improved, we still think that optical scanning could be a potential method for monitoring painted surfaces.¹⁴² The conservator's visual observations and use of the so-called acoustic method, a gentle tapping on the surface which reveals irregularities, are still best for registering the condition of painted surfaces.

NIKU has treated distemper décor in 14 churches during the course of the programme period (see tables 1 and 2). The challenge in consolidating matt, water-soluble paint is finding a consolidation substance that binds loose paint and strengthens the paint layer without saturating the structure and thus changing the look of the artwork. Such a consolidation agent must be compatible with the binder in the paint; have known ageing characteristics and preferably decompose naturally, thus making reconsolidation possible.

The consolidation method that NIKU has generally used for distemper decorative painting was established in the early 1990s when the paintings in Uvdal stave



Nore stavkirke. The decorative distemper painting was painted directly onto the hewn surface and no further working of the wooden surface was needed. Here the vines on the timber walls of the southern gallery at Nore can be seen. These resemble the vines in the nave's oldest ceiling, but are freer and more coarsely painted. This adornment was probably added just after 1709. Photo: Tone Marie Olstad, undated.

church was about to be treated. A technique was selected after testing consolidation agents and various methods, and it continues to dominate the conservation of matt paint in Norway.¹⁴³ Sturgeon glue was preferred as the consolidation glue because it changes the visual appearance of the distemper paintings the least; it is a natural adhesive substance which decomposes in the same way as the original binder, and it has strong penetrative powers and a high degree of adhesion in low concentrations.¹⁴⁴

The consolidation is done with sturgeon glue dissolved in water at the required concentration and applied through Japan paper to the surface with a brush. The paint is then put in place before surplus glue and the paper is removed from the surface. All the work is done with Japan paper protecting the paint surface because direct contact would cause damage. This treatment results in the minimum visual change to the distemper painting and a successful consolidation in most cases. NIKU has found that the thickness of the coat of paint, or earlier treatments of the painting, may have an impact on the process and the result. Where it has been difficult to stick the paint to the base, a local adhesion with a fine pointed brush and sturgeon glue is used alone or as a supplement.

Local treatment has also been used where the damage is small, simply to avert the need to add a consolidation

agent to a larger area than necessary. Adding as little as possible to an original paint structure is always the goal and only the areas that really need consolidation are treated. Drawing the line between what should be treated and what should not, can be difficult when the distemper paint has a binder that has weakened unevenly. The principle is that invasive treatment, such as sturgeon glue consolidation of distemper paint, should not be done preventatively, even when the conservator knows that deterioration will continue and it might be ten or fifteen years before there is another opportunity to control this particular distemper paint.

The consolidation of painted art is not expected to last forever. It is a process that must be repeated as needed. Nevertheless, the intervals between consolidations should be as long as possible, both for the sake of the art and for the budget limitations of those responsible for the preservation of cultural monuments. As the Stave Church Preservation Programme came to an end, a follow-up examination of the consolidated paintings was made, and in several cases paint was found to lack proper adhesion to the underlying base. It is worrying that flaking is detected in some of the consolidated paintings just a few years after they have been treated.

As a follow-up to the consolidation issues, a specific project was started in 2014 to evaluate sturgeon glue as a consolidation agent.¹⁴⁵ NIKU has researched the available literature and contacted professionals in Europe and America for updates in knowledge about the conservation of matt, water-based paint. The project was run in collaboration with Danish and Norwegian chemists but the work has provided no conclusive results to date, and nor have any common parameters been found for the distemper paintings where loose paint has been registered after treatment.¹⁴⁶

The Directorate for Cultural Heritage recognises the importance of this work and the project has carried on after the Stave Church Preservation Programme ended. The work ahead will continue to involve close cooperation between conservators and chemists to obtain information about how sturgeon glue impacts the structure of the paint. The conservators in the project are open to considering consolidation agents other than sturgeon glue. The project must reach a conclusion that facilitates necessary, local reconsolidation of the distemper décor in the stave churches.

Summary

Distemper decorative painting is both an important part of the stave church interiors, and a conspicuous surviving element in the history of changes made to the stave churches. Distemper paint has been removed intentionally; it has been the victim of changes to the interior or destroyed by moisture and general use. Despite this, and regardless of the paintings' vulnerability, distemper paint decoration has survived in about half the remaining churches. In seven of these, the distemper paint is from the Middle Ages. Through the Stave Church Preservation Programme, the Directorate for Cultural Heritage has provided an opportunity to compile a register of the distemper paintings and treat them where necessary. Work on consolidation problems has been started and continues under the guidance of NIKU and the Directorate.

The Stave Church Preservation Programme has contributed to increased knowledge about distemper decorative painting, but many areas still need to be tackled, both by conservators and art historians. Initiatives are underway in some of these areas: the conservators at NIKU have been amassing information about the post-Reformation distemper decorative painting in particular since the 1990s, so that we now have knowledge about the painters' use of pigments, some knowledge about the binder and a considerable amount of knowledge about the painting technique applied to create the distemper decorative painting. Continuing work on church book-keeping records may increase our knowledge of the painters and the conditions under which they worked. We take it for granted that the painting was influenced by styles from abroad but these have yet to be located in a European context. Perhaps this chapter will help to trigger interest in stave church distemper painting and inspire someone to tackle the areas where our knowledge is inadequate.

Independent of future research, the use of heating in the churches must be regulated so that the paint can be preserved with a minimum of conservation initiatives. The decorative painting must also continue to please as many visitors as possible for generations to come, just as they pleased Anders Aubert in the late 1800s: "What decorative painting I have seen just in Numedal and Eggedal – in Renaissance and in Rococo style – exceeds even my most daring thoughts of beauty – a versatility greater than I had imagined; often a noblesse, which I hadn't envisaged: a rich and remarkable delight in colours, which is always unabashed – yet is often so wistful."¹⁴⁷

5. DENDROCHRONOLOGY BRINGS NEW LIFE TO THE STAVE CHURCHES

Dating and material analysis

TERJE THUN, JAN MICHAEL STORNES, THOMAS SEIP BARTHOLIN
and HELENE LØVSTRAND SVARVA

How old is the church? This has been a recurring question to stave church guides and not least to stave church researchers for decades. The question is important because the stave churches are original buildings from the Middle Ages and today they can serve as an architectural history archive. The Stave Church Preservation Programme created opportunities to use dendrochronology for more precise and detailed dating of different construction elements in some of the Norwegian stave churches.

Earlier, a small number of samples from different churches had been analysed which gave precise datings for these samples. The Stave Church Preservation Programme, on the other hand, carried out systematic analyses of the whole building for a number of the churches; thus it became possible to work with construction elements from multiple construction phases. In particular much work has been done at Urnes stave church. Moreover, the project has enabled the development of a new measurement method, commonly known as “photo-dendro”, which reduces the need to take samples from the construction elements.

Having obtained precise dating for when the timber used in the stave churches was felled through the Stave Church Preservation Programme, both the construction techniques and the choice of materials can be dated. We can now investigate which type of forest the material was

obtained from, and assess what methods were available in different periods. The age of an old building can be established by dendrochronological analysis. Optimally, this method can date the year the timber was felled. The felling date will usually be the start of the construction process and can thus give a precise date for the building. The method is based on comparing the tree ring patterns on an undated sample of wood with a sample with a known age, for example a living tree. If there is an area where the growth patterns between the two samples overlap, the sample can be dated. This is known as *cross-dating*.¹

The American astronomer and physicist Andrew Ellicott Douglass (1867–1962) carried out what is deemed to be the first official dendrochronological dating in 1904 in Flagstaff, Arizona. Douglass observed characteristic narrow tree rings for the years 1880 and 1883 on some trees that had just been felled. When he looked at some tree stumps in the same area, he found the same narrow tree rings, but on the stumps the characteristic year of 1883 was only 11 years from the outer layer, and thus it was easy to conclude that the felling date was 1894, which the landowner was able to confirm.² In 1929, buildings from Aztec and Pueblo Bonito in New Mexico were dated using a chronology of western yellow pine (*Pinus ponderosa*) which at that time dated back to AD 700.³

What about dendrochronological dating in Scandinavia?

Norway and other parts of Scandinavia began using dendrochronology early on, but in order to carry out dendrochronological dating of stave churches and other material, long reference chronologies had to be constructed first. While oak is the most common building material in the southern part of Scandinavia, such as in Denmark and Skåne, conifers, such as Scots pine and Norway spruce are most used in the other parts of Sweden and Norway.⁴

Compared with the USA, the development of Norwegian and Swedish reference chronologies was comparatively slow to begin with. Conifer trees that grow in Scandinavia do not live as long as many American species and thus the tree ring series from each tree or each log that is analysed will be shorter. In order to date timber that was felled hundreds of years ago, it is of no help to develop reference chronologies from living trees alone. This could lead to a reference chronology going back just 300 to 350 years, and only exceptionally will there be examples of older trees.

The opportunity to go further back in time arises from using old timber, for example from buildings, and to work backwards by using ever-older materials (see ill. 1). This entails a great amount of calculation which is almost impossible to carry out without suitable computer programs and so first became accessible in the 1980s. However, a major pioneering piece of work was carried out in Norway on living trees by Asbjørn Ording at the Norwegian Agricultural College in Ås (now the Norwegian University of Life Sciences) and Per Eidem at the University of Oslo.⁵ Unfortunately this work came to a halt: Ording died aged just 38 in 1944 and Eidem left academia in the 1950s to go into teaching.

The motivation to succeed with precise dating was, however, very strong in Norway, and particularly with regard to determining the age of the stave churches. Late in the 1960s and early in the 1970s a number of core samples were taken for dendrochronological analysis in several stave churches.⁶ This was done in conjunction with restoration work which meant that it was possible to gain access to places that are normally inaccessible.⁷ At that time, no reference chronologies had been constructed to date the samples and there was no funding available for measurement work. Hence the samples were not analysed

until the middle of the 1990s when they were made available to the dendrochronology laboratory at the Norwegian University of Science and Technology (NTNU).

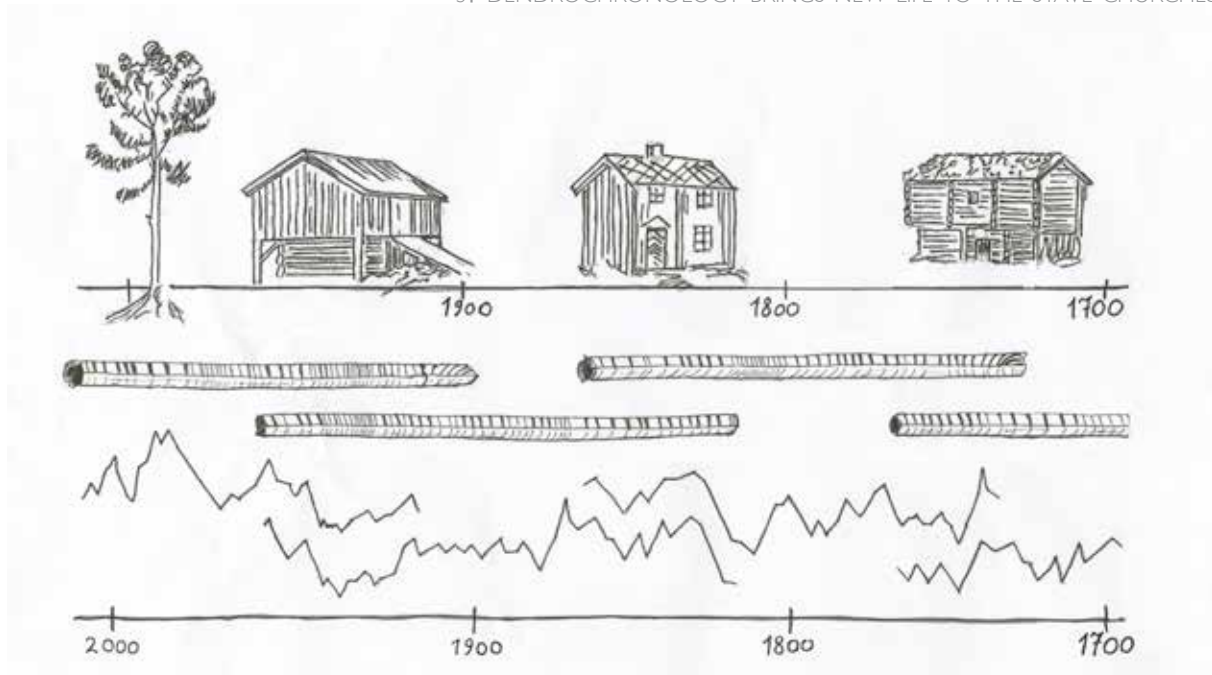
In the meantime, from the end of the 1970s until the early 1990s, reference chronologies were finally constructed for the coniferous region in Scandinavia. These were largely based on building materials from extant buildings and archaeological excavations from various regions in both Norway and Sweden. The work ran in parallel in both countries, which made it possible to compare the growth patterns between the Swedish and the Norwegian chronologies. National boundaries are of no significance when it comes to tree growth and it quickly became clear that the Norwegian and Swedish tree ring chronologies were largely comparable, which enabled good validation to take place.

A large quantity of material was necessary in order for the series to be used to date building material from the Early Middle Ages. It has been difficult to find timber from the 1300s and particularly from after the Black Death in the middle of that century.⁸ It has been a painstaking, pioneering work over a number of years. Today, reference series are available from different regions in both countries, which make it possible to date buildings.⁹ The principle for building up long tree ring chronologies, or reference series, is explained below and shown in the illustration in the section on methodology below.

The construction of reference chronologies and principles for dendrochronology

In order to date building material from the Middle Ages, it is necessary to develop a reference curve, or tree ring chronology, that runs continuously from the present day back in time to the period before the stave churches were built. Chronologies must be developed for each region of the country, as the climate can vary. The development of long retrospective tree ring chronologies is itself the foundation for dendrochronological work. Because one tree ring is formed for each summer, it is possible to determine the age of each individual tree ring from the bark and into the pith of a tree. Many people will have worked out the age of a newly-felled tree by counting the rings on a stump.

With coniferous trees in Scandinavia, it is normally the temperature over the course of a summer that has the greatest effect on the growth pattern of the tree



Ill. 1. The drawing shows how a cohesive tree-ring chronology is constructed going back in time. From an original drawing by the architect Arne Berg; adapted by Helene Løvstrand Svarva, NTNU University Museum.

rings.¹⁰ Put simply, a cool summer will generate little growth, but the warmer the summer, the wider the tree rings that are formed in that year. The width of the tree rings is measured with 1/100 mm accuracy, with specially-designed equipment that transfers the results directly to a PC. When the sample has been measured, the measurement results can be analysed directly. The variation from year to year between narrow and wide tree rings, or the tree ring pattern, is presented graphically and will normally be very similar to the variation in the summer temperature from year to year. This leads to trees of the same species growing in the same area developing comparable growth patterns.

Given that we start with living trees, a chronology can be built up from the present day to the innermost tree ring when the trees began to grow. Then it is possible to take timber from a building where the outer, most recent tree rings in the timber grew at the same time as the inner, oldest tree rings in the trees one started with. The overlapping area will often have the same growth pattern. The older timber is dated against the series from the trees, but at the same time the older timber may extend the chronology. In this way, increasingly older material can be used, as far back as can be found either

from buildings or from logs that are found in bogs and lakes.

It is important to quality-assure the tree ring chronologies that are developed so that the dating is reliable. Firstly, it is of great benefit to work together with colleagues in other countries who are also developing chronologies. In this way it is possible to compare the series that are being developed. This is an example on how replication, or verification, can confirm the quality of the chronology. Another example is if a mean curve is based on several logs in a house, it can be dated against a reference chronology. If the growth pattern corresponds year by year along the whole mean curve, this means that the chronology must be correct for the whole of the relevant overlapping area. In this way it is possible to check a reference chronology every time a dating is carried out.

Due to local climatic conditions it is necessary to develop chronologies on the basis of a large amount of statistical material. This is done by calculating mean curves from large number of trees or logs that were living at the same time. The mean curves are an average of the width of the tree rings for a number of trees or logs, year by year retrospectively. In order to obtain statistically

good material, at least 10 trees or logs are needed from each year. A mean curve will usually strengthen the common growth influences, such as temperature, and at the same time equalise individual growth patterns for individual trees.

A dating of the mean curve is performed by comparing it year for year with the reference curve with known ages, until an area is found where the two curves have a matching growth pattern. It is necessary to gain an objective statistical measure for the correspondence between the two curves, which requires comprehensive calculations. Finally the curves must be drawn and compared visually. Only after suitable computer programs were developed did it become possible to handle all the time-consuming calculations and to develop and quality-assure long dendrochronological reference chronologies.¹¹

Core samples

Core samples from the early 1970s were taken using an increment corer, specially designed to take samples from living trees. A hollow drill is driven into the tree by hand and a sample of wood remains inside the drill. The wood around the drill expands and this usually works well on living trees where the wood is moist. With dry timber, on the other hand, this can easily lead to cracking and the samples will be destroyed. This was the only type of drill that was available for taking samples for dendrochronology at that time. A large number of samples were taken from several stave churches, but the samples broke easily and it was particularly difficult to get the sapwood out intact.¹² As a result, only a few samples were of a quality that could be used and could thus contribute to the dating process, as for example with the stave churches at Lom and Reinli.

In the 1980s, a new corer was developed. It can be attached to a drill and cut out wood around the core sample. The result is a pencil-thin sample in the corer. This corer is well-suited to timber in extant buildings, and if the correct drilling technique is used, and the corer is handled and sharpened correctly, it will result in good samples with no breaks.

It is emphasised without doubt that the very best basis for dendrochronological analysis is physically to extract samples from the material that is to be investigated, and take the samples to the laboratory. A core sample is an authentic part of the object being investigated and it

can be analysed and checked as often as required. The disadvantage is that this is an incursion and the material will be permanently removed from, for example, a stave church, a log building or other objects worthy of protection. It is important that only people with the necessary training who have mastered the drilling technique take core samples from extant buildings.

In recent years the development of non-destructive methods has been a good supplement, which has reduced the number of core samples taken. One requirement is access to level surfaces where the tree rings are visible. The method has therefore largely been used on wall planks in stave churches.¹³

The Stave Church Preservation Programme has been important in this development work, and many datings are now available as the method has been used successfully on wall planks in stave churches. Attempts were first made to measure the width of the tree rings directly on the planks using a magnifying glass with an in-built measurement scale, while a second person simultaneously noted the widths. This method was soon abandoned as it was time-consuming and stressful. There were also no opportunities for subsequent testing and checking the measurement series during the analysis work at the laboratory.

The so-called photo-dendro has, on the other hand, proved to be successful. It is based on taking photographs of the wall planks and measuring the width of the tree rings on the actual photograph. This is a method that does not cause damage to the object, and it is possible to study more construction elements than were accessible when taking samples using a drill. Furthermore, the photographs can later be used for any subsequent testing and verification during analysis work at the laboratory.

Sapwood statistics

In connection with the dendrochronological dating of a building or an object, it may be the case that the felling date cannot be established because the final tree rings below the bark have not been preserved. This means that an unknown number of years must be added. In order to achieve more precise dating for this material, attempts have been made to develop a method which, on a statistical basis, can estimate approximately how many tree rings are missing. This is normal for oak, because oak

almost always has a limited number of tree rings in the sapwood, with only a few years' variation in relation to age and provenance.¹⁴ As a rule this involves 20 years \pm 5 years. In practice this means that if the sample has preserved tree rings in the sapwood, 20 years are added to the outer tree ring in the heartwood and the dating is given with an uncertainty of \pm 5 years.

However, a similar connection does not apply to pine. With a 100-year old pine tree there will be on average 50 tree rings in the sapwood with a variation of \pm 20 years, while in a 200-year old pine there will be an average of 75 tree rings in the sapwood with a variation of \pm 35 years. The number of tree rings in the sapwood (A_s) for pine is much more a function of the tree's age (A_c). With dendrochronological dating with an unknown number of tree rings missing in the outer layer, the age is unknown and thus it is not possible to obtain a reliable estimate of how many sapwood tree rings can be expected.

Often the number of tree rings in the heartwood is known (A_H). This applies when the sample has hit the pith, or is so close that the missing number can be estimated, while at the same time a number of sapwood tree rings can be proven. If it is possible to estimate how many tree rings can be expected in the sapwood based on the number of tree rings in the heartwood, the felling date can be determined; this is a quantum leap in relation to a situation where an unknown number of years has to be added to the dating.

From the late 1990s data, from the dendrochronological samples were systematised. This made it possible to estimate the expected number of tree rings in the sapwood, given the number of year rings in the heartwood, and at the same time estimating the uncertainty, i.e. \pm x years.

In 2002, Peder Gjerdrum presented a formula that demonstrated the connection between age and the number of tree rings in the sapwood in modern trees from the whole of Norway.¹⁵ In 2012 Thomas Seip Bartholin produce a simplified linear formula, described below as formula 1. This formula demonstrates the connection between the number of tree rings in the heartwood and the number of tree rings in the sapwood: $A_s = 30 + 0.4 * A_H$. The formula makes it possible to calculate a possible felling time very well, with the exception of very young and very old trees. For the time being this is a working basis until the results of a statistical reworking

of a large amount of material from historical samples are available. This reworking will also show whether there are geographical and time-related differences in the formation of sapwood in pine trees in Scandinavia.

In 2013, Peder Gjerdrum published a similar formula, but in the form of a second-order comparison which gave very good results for both young and a large trees,¹⁶ $A_s = (\sqrt{A_H + 3})^2 - A_H$. The two formulae have a deviation of just \pm 1 year when the number of years in the heartwood is between 23 and 104 years.¹⁷ What remains is a further systematisation of data to be able to give a more precise estimate of the uncertainty and eventually to be able to state this as a function of where in the country the timber was felled.

Measuring using photographs is done on flat surfaces, such as the radial section of stave church planks. The above formula cannot be used even though the sapwood tree rings can be seen on the planks, as it is not known how many tree rings are missing in the heartwood. It is more or less necessary to have to guess how many tree rings might be involved.

In 2012 Thomas Seip Bartholin came up with a simplified linear formula, described below as formula 2. In formula 2 the anticipated number of tree rings in the sapwood is a function of the average tree ring width of the outer 50 tree rings in the heartwood. This formula is a provisional method until the results of a statistical reworking of a large sample of material is available. Formula 2 makes it possible to carry out this calculation without having to know the actual number of tree rings in the heartwood: $A_s = 100 - 0.35 * B_{50}$, where B_{50} is the average tree ring width of the outer 50 tree rings in the heartwood.

The formula has been specifically calculated to be used together with the "non-invasive" method of photo-dendro. The formula can be used anywhere on pine wood where it is possible to find a clean surface where all the tree rings can be seen and are intact, in cross-section or on radial surfaces. This usually includes processed materials, such as planks, chests, paintings and musical instruments. Bark is seldom found on these types of objects.

The formula can also be used when dendrochronological samples do not include samples with bark, for example logs where the bark has been removed or attacked by insects, so that the sapwood no longer holds together. The method can determine whether the ma-

material was felled before or after 1650. Buildings which predate 1650 are automatically listed according to Norwegian cultural heritage legislation.¹⁸

After many years of dendrochronological analyses in Norway, there is now a large quantity of material which can contribute to a statistical basis for determining the accuracy of the felling date. This material consists of many thousands of individual samples which can be divided geographically, by age, and chronologically. Working with this material can show how homogeneous, or possibly heterogeneous, it is; it is possible that a statistician may need to be brought in. The Stave Church Preservation Programme has been an important contributor in obtaining material and data for this, and hopefully this is an issue that can be taken further.

Below are some examples of good results, where the formulae have been used on already-dated objects and the results are surprisingly good. The examples are from buildings from Hedmark and Buskerud dated using dendrochronology. The CATRAS number is the dendrochronological archive number.

Table 1

Object, CATRAS-number, Hedmark	Number of samples	Dating using Formula 1	Normal dating using bark edge
0350020-0350041	17	1730	1729
0350042-0350056	5	1772	1773 and 1774
0350057-0350076	11	1683	1688
0350077-0350091	12	1758	1758
0350092-0350104	10	1785	1786

Table 2

Object, CATRAS-number, Buskerud	Number of samples	Dating using Formula 2	Normal dating using bark edge
0550066-0550088	5	1715	1704 and 1705
0550068-0550077	6	1646	1648 and 1649
0550094-0550108	9	1573	1574
0550109-0550118	3	1774	1765
0550129-0550137	6	1553	1558
0550147-0550157	8	1555	1555 and 1556

In Urnes and Kaupanger stave churches, formula 1 cannot be applied because the innermost tree rings at the heartwood have not been preserved. By using formula 2, the following results are obtained:

Table 3

Urnes stave church The old church	Number of samples	Dating using Formula 2
Dating with samples of traces of sapwood	4	1078
Nave, north wall	5	1080
Nave, south wall	9	1068
Choir	2	1071
Nave and Choir, above samples	16	1072
All samples from transept and choir	30	1058

Samples with traces of sapwood were chosen, as the boundary between hardwood and sapwood is certain, row 1. The other rows show samples with heartwood only, but dated to after AD 1000, and assuming that the minimum amount of heartwood has been removed. The last row includes samples where the outer tree ring is dated to before AD 1000. Where the dating is older, this may mean that several tree rings have been removed in the heartwood in the older samples.

The ornate plank west of the door on the north side of Urnes stave church contains sapwood, and the outer tree ring from 1069 is deemed to be the felling date, or very shortly before this date.¹⁹

Table 4

Urnes stave church The new church	Number of samples	Dating using Formula 2
Dating samples with traces of sapwood	10	1128

Table 5

Kaupanger stave church	Number of samples	Dating using Formula 2
Chancel	8	1156

Table 6

Hopperstad stave church South wall of nave	Number of samples	Dating using Formula 2
Dating samples with traces of sapwood	14	1131

At times, the sapwood can be difficult to see, both on site and in the laboratories. We are in the process of developing a method which builds in part on a highly-sensitive heat camera to solve this problem.

We hope that this section has emphasised that dendrochronology also possesses a hitherto undetected opportunity to refine dating results. This requires sam-

ple-taking to be done based on maximum knowledge and awareness of the opportunities inherent in the object. This means that those taking the samples need not only to have mastered the drilling technique, but also need to know about the opportunities inherent in dendrochronology, something that can only be achieved through thorough training and experience.

Previously, stylistic criteria were used to date the stave churches. The stylistic criteria have been under continuous development since the middle of the 1800s, and dating using stylistic criteria has been done by Lorentz Dietrichson (1834–1917), Anders Bugge (1889–1955), Roar Hauglid (1910–2001) and Peter Anker (1927–2012). A number of pivotal studies have been published by Erla Bergendahl Hohler.²⁰ (See Leif Anker: chapter 7).

Today, a good 20 years after the reference curves were developed in Norway, there are multiple results from dendrochronological analyses of stave churches. With precise dates for the felling date of the material, researchers of the future will have a new basis for studying the archives of the architecture of the past which the stave churches represent.

At present, only Urnes, Hopperstad and Kaupanger stave churches have been thoroughly surveyed with the help of photo-dendro. In these churches, the width of the tree rings along several radii on the majority of wall planks has been measured in addition to the core samples, so a large amount of material has been studied. Photo-dendro has also been successfully used at Gol and Borgund stave churches, but on a limited number of construction elements. At the other churches shown below, only a few core samples have been analysed so far, including some old samples taken using increment corer in the 1970s. Even though all the dated samples have provided valuable information with regard to age and choice of material, for the majority of the stave churches this is a modest start. This is knowledge which can only be made accessible via a thorough analysis of a considerably larger amount of material.

Felling date, “post-dating” and sapwood statistics

The felling date for a tree can be established if the final tree ring that was formed has been preserved in the sample. If there are traces of bark, or if the sample

was taken from a place where the surface has not been treated, the so-called waney edge, the felling date can be determined. Timber is worked most easily before it dries out, so there is usually only a short time between the felling date and the year of construction.

If material is missing in the outer layer of the sample, the felling date is later than the most recent surviving tree ring and dating is given as after the year of the outer tree ring, cf. also above on sapwood statistics.

Types of wood

In Norway, Scots pine (*Pinus sylvestris* L.), hereafter referred to as pine, was used in practically all building timbers from the Middle Ages. There are a handful of exceptions, such as oak (*Quercus* sp.), in the southern part of Norway, cf. Høyjord stave church below, and a few instances of Norway spruce (*Picea abies* (L.) Karst.) found in archaeological material in the ground below the city of Trondheim.²¹ Hence the discussion on stave churches in this chapter will only consider pine, including the sections on choice of materials.

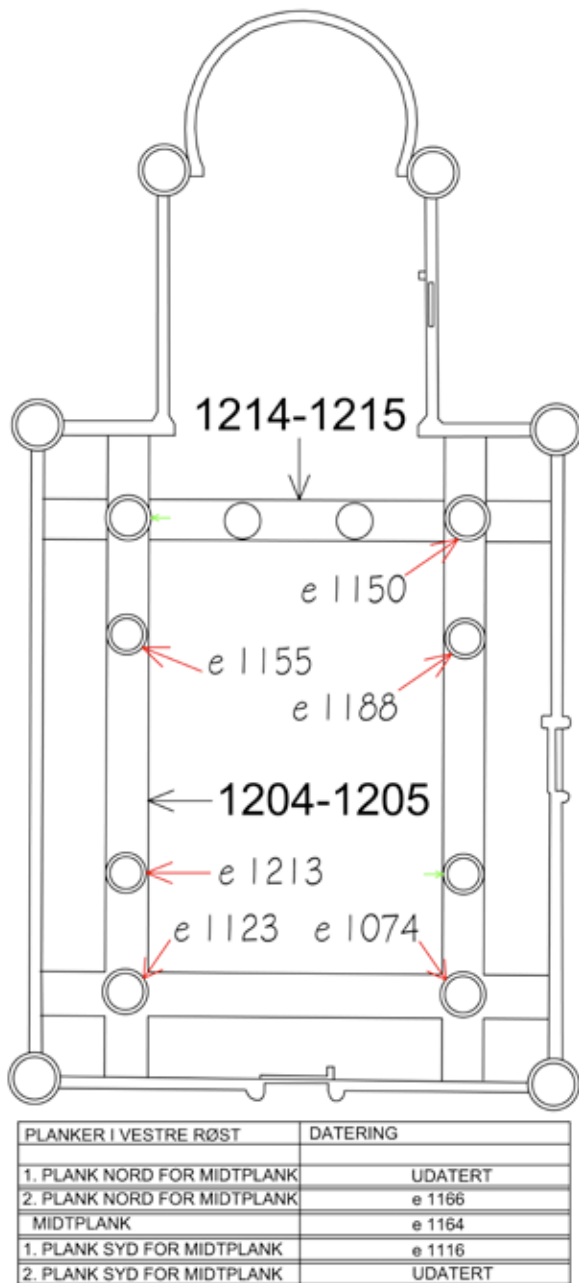
The stave churches of Nes and Grinaker have been demolished, but preserved material has been analysed without results, and hence these churches have not been included in the overview. Røldal stave church is not included either, as it has not been possible to date the dendrochronological samples from this church. One reason may be that the samples were taken from construction components from different periods.

Plan drawings

Plan drawings have been used for the majority of stave churches to show which construction components have been dated. For reasons of space it is not really appropriate to use plan drawings when only a few samples are taken, or where an unknown number of tree rings are missing in the outer layer of the samples. The exception is where the dating is of particular interest, such as at Rollag stave church.

Gol stave church: now at Norsk Folkemuseum Oslo²²

In 1987, core samples were taken using an increment corer from each of the eight posts in the nave.²³ On the



Ill. 2. Plan of Gol stave church with dating included. Drawing: Jan Michael Stormes.

northern row, the outer tree ring on post no. 2 from the west was dated to 1213. It is difficult to determine whether there are any tree rings missing in the outer wood, but the felling date was probably shortly after 1213. The other posts have been processed to a greater extent and have outer tree rings from the preceding years, which may indicate that all the posts in the nave were felled at the same time.

Two new core samples were taken below the floor on 29. 8. 2012 (numbered samples 9 and 10), both with bark.²⁴ Sample 9, the east raft beam, was felled in the winter of 1214–1215, and sample 10, the north raft beam, was felled in the winter of 1204–1205 (ill. 2).

In the same year, photographs were taken of planks on the outside of the west gable. The outer tree ring is from 1166, but a number of tree rings are missing in the outer layer due to the way the planks were processed. The results indicate that the church must have been constructed at the beginning of the 1200s.

The planks in the church's nave which are deemed to be original have very different surface treatments. Some are finely-polished while others are finished using a specific North European medieval hewing technique known as splash whittling (Norwegian: *sprettelgjing*), used to finish the surface of exposed material as planks.

Detailed observations and notes made in connection with photo-dendrochronology at Urnes, Kaupanger, Borgund and Hopperstad have shown that the individual alignment between the planks was extremely precise. Similarly, a great amount of work has gone into making the surface facing the nave of the church as smooth and fine as possible. Based on this, one might ask why finely-polished planks in Gol stave church stand side by side with planks that have been finished using splash whittling. One explanation may be that these originally were planks from two different churches, or alternatively this could be the result of different building phases or repairs. This question could possibly be answered by carrying out photo-dendro on the planks further down in the church

Torpo stave church

In Torpo stave church, 14 core samples were taken using an incurrence corer in 1987.²⁵ The samples were taken from posts in the nave, but none of the samples were taken in places where bark was found. The outermost



Ill. 3. The site where Ål stave church stood until 1880. Photo: Terje Thun 1995.

dated tree ring is from a core sample taken from the second post from the south wall in the nave's western internal row of posts, with 1163 as the date of the outer preserved tree ring, while the other samples have existing outer tree rings from before 1163.²⁶

Ål stave church

The church has been demolished but many of the wooden planks have been preserved and were transferred to the new museum near Ål church in 1994. Between 18 - 20.4.1994 the planks were studied by the architects Egill Reimers from Bryggen Museum in Bergen, and Håkon Christie and Ola Storsletten from the Norwegian Directorate of Cultural Heritage. A new inspection was carried out 11.5.1994 by Tine Frøysaker, Håkon Christie and Ola Storsletten. For the most part, the material consists of wall planks with tongue and groove and can be divided into three main groups. There is also a fourth group which does not fit into the main categories.

Group 1 contains materials from the original church and is characterised by being "finished" with a profile consisting of a single flat moulding along the groove side of the planks.²⁷ The groove has been cut out with an axe and a gouge has been used at the bottom of the groove.

Group 2 contains planks that probably come from the medieval extension to the church. The group is characterised by a planed profile consisting of a U-shaped moulding with a V-shaped contour on each side, finished along the groove side of the plank. Along



Ill. 4. Figure with most recent tree ring from 1134. Probably part of the original Ål stave church. Photo: Terje Thun 1995.

this group the groove has been cut out with an axe and a gouge has been used at the bottom of the groove. Group 3 consists of planks which probably date from when the stave church was extended in 1699.

Originally the planks were chamfered at both ends to enable them to be fixed to sills and wall plates. Where the chamfering is preserved, the effective height of the planks from sill to wall plate can be estimated. The inside of the planks is flat but also gently convex or concave. Where the inside is concave, the planks probably come from the church's apse. The gentle convex curve is probably due to the wood drying out. This indicates that there was a relatively short time from felling to construction.

In July 1994 samples were taken from most of the planks for dendrochronological investigations by Ola Storsletten, NIKU, and Terje Thun, NTNU. In the majority of cases the tree rings were measured along the cross-section using a measuring magnifying glass.

Group 1

The planks deemed to belong to group 1 are assumed to come from the original stave church. A total of 12 planks from the group were analysed and the outer tree rings on the different planks varied from 1103 to

1143. This indicates the planks in group 1 are from the original church and that the felling date was probably in the middle of the century.

The tree rings were also measured on the cross section of the figure shown on the previous page (ill. 4). The outer tree ring was dated to 1134 and with so much processing of the log, it is estimated that the felling date was also in the second half of the 1100s and that the figure belongs to the original stave church,

Group 2

According to the report from Storsletten, the planks in group 2 are assumed to come from the medieval extension of the church. Eleven planks were analysed and the outer tree rings varied from 1187 to 1247. This is about 100 years later than the material in group 1, and is likely to be from the extension to the church, probably in the second half of the 1200s.

Group 3

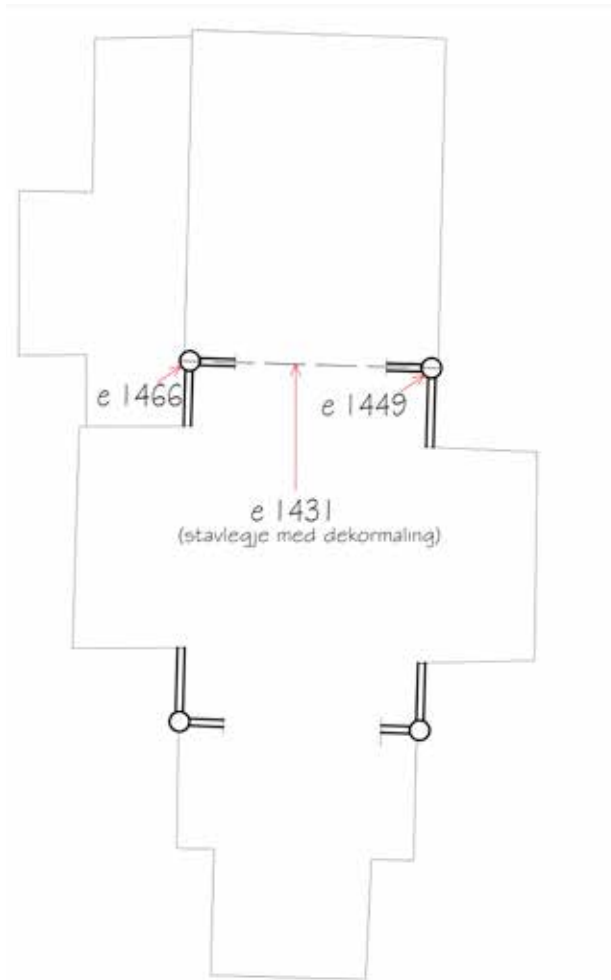
The planks in group 3 are, according to Storsletten, probably from the extension of the stave church in 1699. A total of 12 planks were analysed and outer tree rings vary from 1505 to 1646. It appears that the material was well worked in the outer layer so that a number of tree rings are missing, but indicates that the material is post-Reformation and may date from the extension in 1699.

Group 4

The planks in group 4 are, according to Storsletten without stylistic signs that could date them. Four planks were analysed and these have outer tree rings from 1112 to 1230.

Flesberg stave church

In 1987 core samples were taken using an increment corer from three nave posts of Flesberg stave church.²⁸ Sample 1 was taken in NE corner post. This has an outer tree ring from 1084, but due to previous incidences of decay, much of the outer part of the stave post is missing. Sample 2 was taken in SE corner post but failed due to a crack in the log. Sample 3 from SW corner post has an outer tree ring from 1154, but the post has been well-worked so that the felling date is some time after 1154. Up to now, these are the only dendrochronological samples taken in Flesberg stave

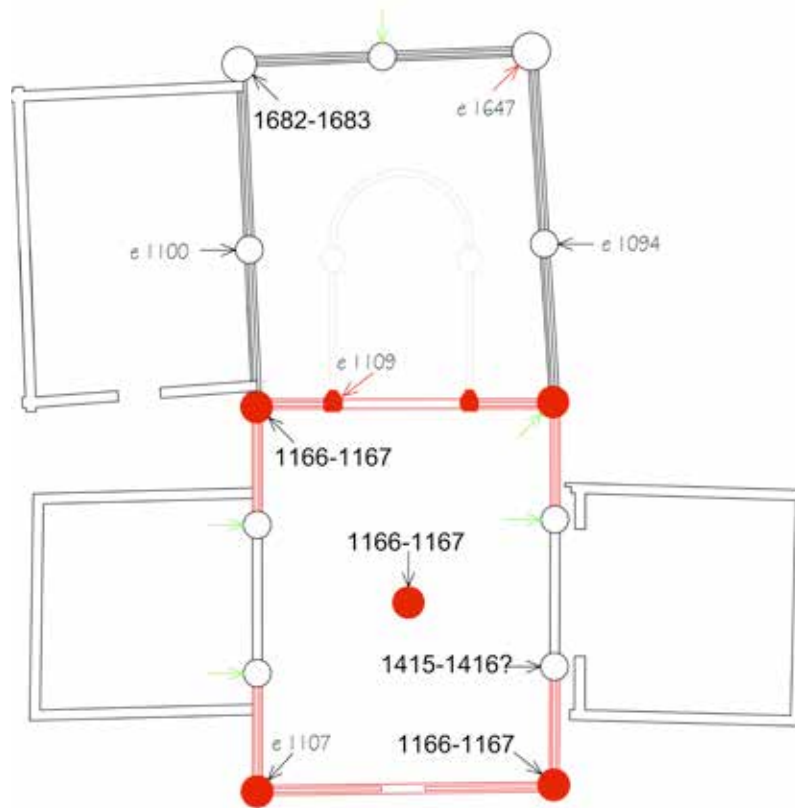


Ill. 5. Plan of Rollag stave church with dates of the different construction elements. Drawing: Jan Michael Stormes.

church. Stylistically, the church has been dated to the period between 1170 and 1200.²⁹

Rollag stave church

In Rollag stave church two core samples were taken with an increment corer in 1987, neither with the outer tree ring preserved.³⁰ Sample 1 was cored from the NE corner post in the nave with an outer tree ring from 1446 and sample 2 was cored from the SE corner post with an outer tree-ring from 1449 (ill. 5). The felling date of the tree from which the post was fashioned is an unknown number of years after 1466. However, as can be seen from the section on sapwood statistics, it is possible



Ill. 6. Plan of Nore stave church with dates of the different construction elements. The extent of the original stave church is marked in red. The original staves that still exist are shaded in red. Drawing: Jan Michael Stormes.

to give a felling date if the number of tree rings in the heartwood is known.

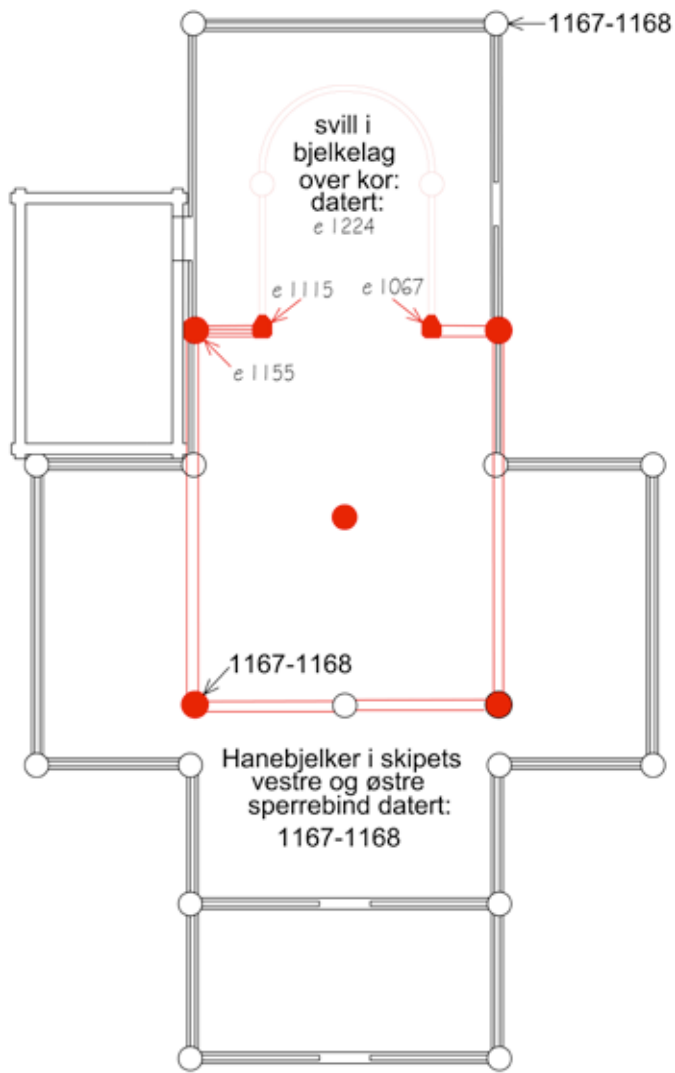
Sample 1 contains 92 tree rings, of which 29 are in the sapwood. The sample goes right into the pith and has 63 tree rings in the heartwood, where the outer ring is from 1405. Based on this value, about 57 tree rings can be expected in the sapwood.³¹ This gives an assumed felling date of $1405 + 57 = 1462$. The final preserved tree ring on this post is dated to 1466, and it can be concluded that the most probable felling date is shortly after 1466.

This dating is unexpected, as it had been assumed that the church was from before 1350, an assumption that is not contradicted by the decorative painting on the wall plate between the two dated nave posts.³² It was therefore decided to take samples from the wall plate and the analysis showed that it had been fashioned from a tree that had been felled after 1431. Given that both heartwood and a definite sapwood division were lacking, the formulae could not be applied, but it is very likely

that the wall plate is contemporaneous with the nave posts, i.e. shortly after 1466.

Nore stave church

In Nore stave church, samples were taken at places with bark and waxy edges in February 1999.³³ The felling date of the samples from the nave's NE and SW corner posts were all dated to the winter 1166 – 1167 (ill. 6). The intermediate posts of the nave were introduced later, in the Middle Ages, when transepts were added. Samples were taken from the two intermediate posts in the south wall of the nave and the western one was dated to after 1415. As the sample site may have the most recent tree ring preserved, it is possible that the felling date was the winter of 1415–1416, or shortly afterwards. One sample from another post in the nave was deemed to have the most recent tree ring preserved but it was not possible to date the sample. Samples were



Ill. 7. Plan of Uvdal stave church with dating of the different construction elements. The extent of the original stave church is marked in red. The chancel has been demolished, but the original staves that still exist are shaded in red. Drawing: Jan Michael Stormes.

taken from the two intermediate posts in the north wall of the nave, but these could not be dated either. In the chancel a sample was taken from the NE corner post which was dated to the winter of 1682–1683.³⁴

As is shown in ill. 6, the posts in the chancel are from post-1100 and post-1094 respectively. This may be a case of reusing the posts that stood in the original chancel, indicated with red lines. The results from 1999

are published in The Society for the Preservation of Ancient Norwegian Monuments' annual publication.³⁵

Uvdal stave church

In Uvdal stave church, four samples were taken in 1999 from areas with bark.³⁶ Two of the samples are from the base of the nave's NW corner post and a reused post in the SE corner of the chancel; the two others are from the nave collar beams in the nave's east and west roof trusses. The analysis shows that all the material was felled in the winter of 1167–1168 (ill. 7).

Høyjord stave church

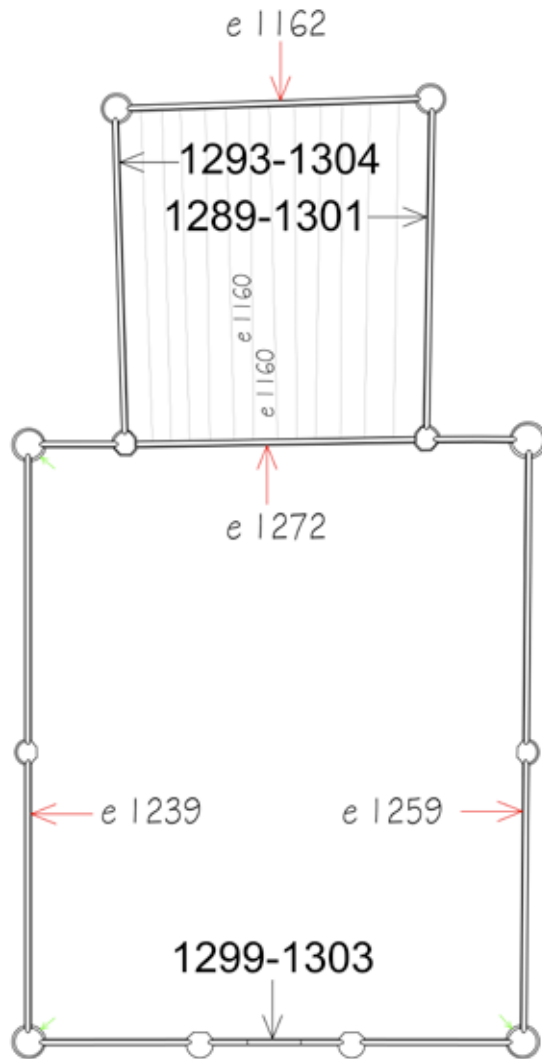
In Høyjord stave church, eight core samples were taken on 18.12.2007.³⁷ Only three samples from a floor plank with traces of splash whittling in the south side of the hatch opening in the chancel could be dated. The samples are damaged in the outer layer, and the outermost tree ring that remains is from 1160.

Additional samples were taken in September 2013 at the request of Niels Bonde of the National Museum in Copenhagen.³⁸ The samples were taken as part of the development of the Norwegian oak chronology: they were of a good quality and the results are presented in Bonde's report (NNU Rapport 51-2013). According to the report, samples were taken from seven oak sills and two pine floor planks. None of the samples had the outermost tree ring preserved, but several of the oak sills had sapwood which made it possible to give a relatively precise felling date. According to the interpretation of the results in Bonde's report:³⁹

Based on the result of cross-dating, relative and absolute, the dated samples material can be divided into two groups. Two samples (both from the chancel) come from trees that were felled in the 1160s. The timber in this group is reused building timber and probably comes from a church (stave building) built around AD 1161–1170. Six samples (nave and chancel) come from trees that [were] felled around AD 1300.

Hence the church's current nave and chancel date from around AD 1300.

See also the plan drawing (ill. 8).



Ill. 8. Plan of Høyjord stave church with dates of the different construction elements. Drawing: Jan Michael Stormes.

Lom stave church

During a major restoration project early in the 1970s, it was possible to take samples from normally inaccessible places in the church. In 1973 samples using an increment corer were taken from 46 different building parts.⁴⁰ The samples were sent to the laboratory in Trondheim in 1997, and were measured in the same year. Several samples were damaged, but as two or more samples had been taken from each construction element, measurable samples were available for almost all the building parts where samples had been taken.

The results, where the outer tree ring shows the felling date, or the approximate felling date for timber in the nave, are:

East raft beam: winter 1158–1159

North raft beam, west end: winter 1158–1159

North raft beam, east end: winter 1158–1159

East sill beam, in front of the chancel:

winter 1157–1158

Interior post in west, no 1 from north: felled after 1157

West raft beam: felled after 1157

Southern sill beam: felled after 1156

The “post-datings” are due to the fact that one or two tree rings are missing in the outer layer of the samples: it is likely that this timber was also felled in the winter of 1158–1159.

The others samples lacked tree rings in the outer layer and some of the samples had a number of cracks. It can therefore be difficult to decide whether they were felled at the same time as the other dated material, or whether some may have been reused from an earlier church on the site. Further investigations need to be carried out at Lom.

Early in the 1630s, the nave was extended to the west with an extension built using notched logs.⁴¹ Two dated samples exist from this construction. The first is from the sill below the uppermost beam in the opening between the church and the western extension. The outermost tree ring from the sample is from 1632, and the tree must have been felled a short time afterwards. The other is from the western sill in the extension and the outermost tree ring on the sample is from 1631: again the tree must have been felled shortly afterwards. This is probably material from the extension to the church which was built in 1634.

Ringebu stave church

Eight core samples were taken using an increment corer at Ringebu stave church on 1.8.1980.⁴² The samples were made available to the laboratory in Trondheim in 1997. The samples from the north and south raft beams have bark and were felled in the winter of 1192–1193. According to Nils Brandt’s field notes, one sample was taken from the left raft beam at a site with bark, but damage to the sample meant that it was not possible to measure it right out to the outer layer.

The outermost surviving tree ring on the sample is from 1183, but it is likely that it was felled at the same time as the two other dated samples. It has not been possible to date the other samples, so there are just three dated samples, but all indicate the construction of the existing church early in the 1190s.

Hedalen stave church, Sør-Aurdal

In Hedalen stave church, eight core samples were taken on 5.11.1997.⁴³ Two of the samples were taken from the nave's north raft beam and were felled in the winter of 1162–1163. One sample from the nave's east raft beam shows a felling date for the year before: the winter of 1161–1162. Two samples were taken from the nave's west raft beam: both are lacking tree rings in the outer layer. On both, the outermost tree ring is from 1132. A sample from the nave's south raft beam, which is also lacking material in the outer layer, has an outer tree ring from 1150.

The other samples have a number of cracks and thus cannot be dated. The dated beams indicate felling early in the 1160s. This shows that trees were felled for building the church early in the 1160s.

Reinli stave church

A total of 41 samples taken with increment corer were taken at Reinli stave church early in the 1970s.⁴⁴ The samples were made available to the laboratory in Trondheim in 1997 and analysed. Only three of the samples contain bark, or were taken at places with traces of bark.

One of the samples is from the south floor beam, felled in the winter of 1323–1324. In Nils Brandt's field notes it does not state whether the sample was taken from the nave or the chancel. The two other samples are from the apse's centre floor beam and south floor beam, east part. Both were felled in the winter of 1325–1326. The outermost preserved tree rings from the other samples are from the years prior to 1324, but the surface has been worked and the felling date cannot be established.

In total, 27 of the core samples taken at Reinli in the 1970s have been dated, but the outer surviving tree rings on these samples vary considerably. Thus it can be difficult to determine whether the large variations are due to missing tree rings on the samples, or whether the material could also contain reused construction

elements from an older church at Reinli.⁴⁵ Reinli is also interesting as the dated material with outer tree rings from the 1300s contains more than 300 tree rings; cf. the later section *What characterises the materials chosen for building the stave churches*.

Lomen stave church

Eight core samples were taken at Lomen stave church on 17.10.2001.⁴⁶ Two samples taken from the aisle's SW corner post have outer tree rings from 1192, but it is not possible to determine with certainty whether the sample site has the outermost tree ring preserved. The samples from the other construction elements have so many small cracks that it is not possible to analyse them. This material is too sparse to be able to draw any conclusions about the felling date.

Hegge stave church

From Hegge stave church ten core samples were taken on 30.7.1998.⁴⁷ The floor board on the south side of the east wall's north centre post was felled in the winter of 1215–1216; the board has been finished by splash whittling. The other samples were taken from worked sample sites and so have outer surviving tree rings from the years before 1215. An additional sample which contains bark in the outer layer was taken on 12.5.2000 from the NW corner post in the central space, 35 cm below the sill. The analysis shows that the tree was felled in the spring of 1216, that is to say that timber was felled for the church at this time and construction may have been underway in the summer of 1216 or shortly afterwards.

Høre stave church

In 1979 eight core samples were taken using an increment corer at Høre stave church.⁴⁸ In Brandt's notes from 1979 it says "Bark edge?" at the sample sites for both the east and west raft beams and both samples have outer tree rings from 1178. If the observation is correct, the felling date for the trees is the winter of 1178–1179. Later, on 25.7.2000, an additional sample with bark was taken by Ola Storsletten, NIKU. This additional sample was taken from the rafter between the first centre posts, calculated from the west in the nave's ambulatory on

the south side. The analysis shows that the felling date was the winter of 1178–1179. The other samples taken from Høre stave church lack tree rings in the outer layer and all have surviving outermost tree rings from the years before 1178.

Heddal stave church

Six core samples were taken using an increment corer at Heddal stave church in 1988.⁴⁹ Due to multiple cracks in most of the samples, it has only been possible to date two of these. Neither sample has bark or a waney edge. One core sample from the east sill of the chancel with splash whittled side lacks multiple tree rings in the outer layer and the outermost tree ring from 1081. Sample no. 5 from the nave's NE corner post has an outermost tree ring from 1196. This may indicate that the church may be from early in the 1200s, but for the time being there are insufficient samples from Heddal to make it possible to say anything about the felling date for the materials used in the church.

Eidsborg stave church

Provisional investigations at Eidsborg stave church have so far produced few results. In 2005 pictures were taken of several radii on each plank in the west wall of the nave, at the request of the Vest-Telemark museum. In addition, core samples were taken from the nave's NW and SW posts.⁵⁰ The width of the tree rings was measured on the photos but neither the planks nor the posts could be dated. In May 2006 core samples were taken from the four sills in the nave, and two of the samples could be dated.⁵¹ The core sample from the SE post in the nave has an outermost tree ring from 1439 and the sample from the west sill in the nave has an outermost tree ring from 1418. The sample site for the post may have a waney edge, but the sill is lacking tree rings in the outer layer. One of the two samples taken from the NW post has traces of bark, but it has not been possible to date the post. In November 2006 a sample was taken from a roof board in the upper surviving roof and this has an outermost tree ring from 1455.⁵² All the sills that have been investigated are splash whittled.

The construction history of Eidsborg stave church is therefore far from clear. It is interesting that both posts and one sill have relatively similar dates even though

tree rings are missing in the outer layer of the samples. It is too early to draw any conclusions about whether the church is not as old as was previously assumed, and further investigations are required. Many of the construction elements bear clear indications of splash whittling, a technique that is normally associated with the period before 1350, even though there are many exceptions.⁵³

Urnes stave church

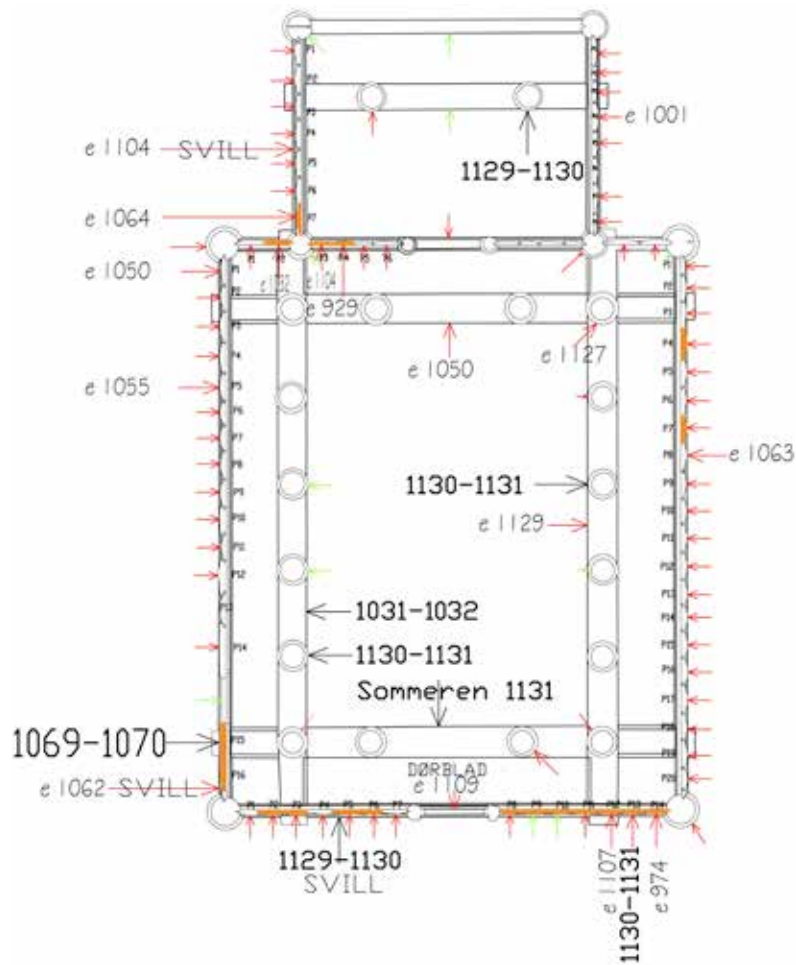
At Urnes, a distinction is made between samples taken from two churches. Where reference is made to Urnes stave church, this means the existing church at Urnes, as described by Håkon Christie.⁵⁴ The reused material from the church's predecessor is described as being from the "Urnes-style church" as described by Knud J. Krogh.⁵⁵ Multiple attempts have been made to date the stave church at Urnes. The first samples were taken with an increment corer by Nils Brandt in the early 1970s. In the 1990s Terje Thun and Jan Michael Stornes took a number of core samples from sills and raft beams under the floor of the church. Several of these samples bear traces of bark and thus the felling date could be determined for several of the beams (cf. plan drawing ill. 9).

In connection with the Stave Church Preservation Programme, investigations were carried out on most of the planks in the church after 2000. This work took place over a long period and was carried out by Thomas Seip Bartholin, Jan Michael Stornes, Terje Thun and Helene Løvstrand Svarva.

Urnes stave church – the existing church at Urnes

Core samples taken from sills/raft beams or posts in the church have made it possible to determine the felling date to early in the 1130s. Core samples from Urnes have shown that both the nave's west sill and the southern chancel post were felled in the winter of 1129–1130, while the second post from the west in the nave's north row of interior posts was felled in the winter of 1130–1131, and the nave's west raft beam was felled in the summer of 1131 (cf. plan drawing ill. 9).

Using photo-dendro method, the planks in the upper central space of the chancel have been analysed. Of particular interest were two planks in the northern wall which have traces of bark: plank 5 from the west and plank 3 from the west. The analysis of plank 5 from

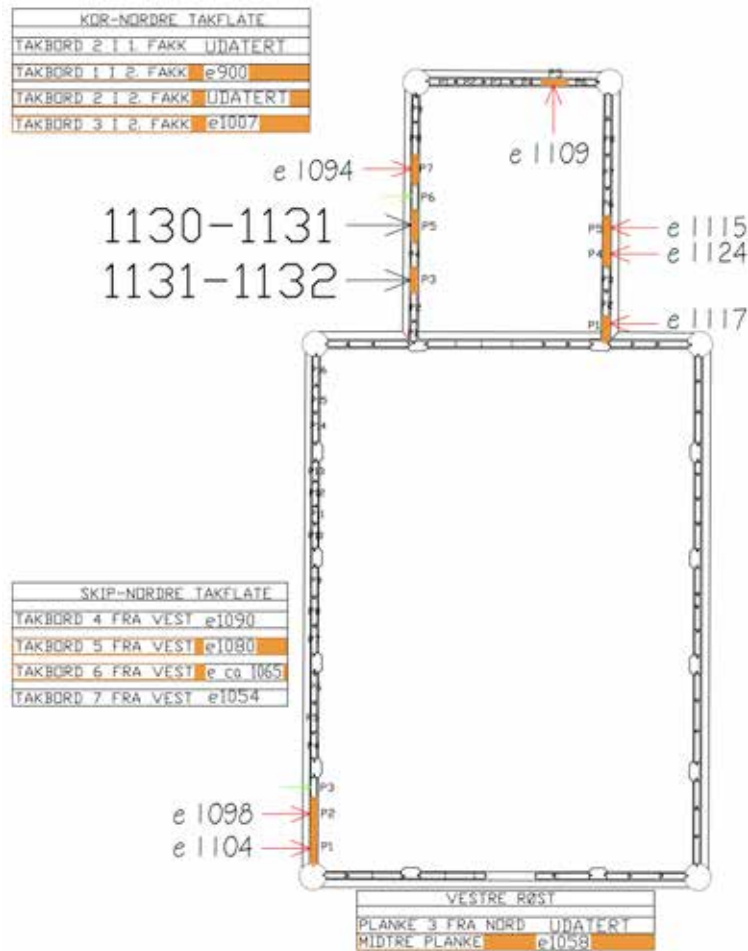


Ill. 9. Plan of Urnes stave church with dates of the different construction elements, including the reused material. For reasons of space, many dated measurements, marked here with small red arrows, have been omitted as much of the material is missing from the outer layer of the wood. Undated construction elements are marked with green arrows. Planks with sapwood have orange shading. Drawing: Jan Michael Stornes.

the west is in accordance with the results from the core samples with traces of bark and the felling date was the winter of 1130–1131. Plank 3 from the west was a challenge as the outer tree rings were very narrow. An attempt to measure the plank was made in 2008, but it was not possible to distinguish all the tree rings on the photograph. In 2013, close-up photographs of the outer area were taken and enlarged so that the tree rings could be distinguished from each other. Measurements were taken along several radii by Seip Bartholin and Thun, independently of each other. All the tree rings were marked on the picture along two radii and the analysis of the measurement series along both radii shows that the outer tree ring below the bark is from the summer

of 1131. Hence the tree from which this plank comes was felled in the autumn of 1131 at the earliest, but could have been felled in the winter of 1131–1132 (cf. plan drawing, ill. 10).

The planks in upper central space of the chancel could be part of the original material that was felled for the church, and thus would have been felled at most one to two years after the dated sills, raft beams and posts. This may indicate that the church had a short construction phase.



Ill. 10. Plan of the central space in Urnes stave church, with datings. Undated construction elements are marked with green arrows. Planks with sapwood have orange shading. Drawing: Jan Michael Stormes

Reused material from the predecessor to the existing church – the “Urnes-style church”

It can be difficult at times to determine whether the sapwood has been preserved, but the majority of planks on the north wall that have been reused from the earlier “Urnes-style church” are missing the sapwood.

The plank east of the door leaf, plank 14 from the east (ill. 11), is one of the ornate planks on the north wall. The sapwood has been removed from this plank (cf. ill. 12) and the outermost surviving tree ring in the heartwood is from AD 984.

On the plank west of the door leaf, plank 15 from the east (16/F according to Knud J. Krogh 2011) (ill. 11),

however, the sapwood is preserved and can clearly be seen (ill. 13). By analysing the measurement series on the plank’s inside, the outermost surviving dated tree ring is from 1069, and appears to be the outermost tree ring at the time the tree was felled, in which case the felling date is the winter of 1069–1070. Against that, however, is the fact that the heartwood faces in towards nave, so that the outer side of the plank at this point would normally contain multiple tree rings, and hence the felling date would be after 1069. In order to investigate this, two 3 cm wide tarred strips were removed from the outer side of the plank (ill. 14 and 15), and photographs were taken of the outer tree rings. The analysis of the outer tree rings found that the outermost was from 1056. This



Ill. 11. The north wall of Urnes stave church with reused parts of the previous stave church. Planks nos. 14 and 15 from the east are those on each side of the key-shaped door: It should be noted that Knud Krogh numbers plank 15 as 16/F, as he numbered the portal's lintel as plank 15/E. The letters refer to the location of the planks in the preceding church's west wall. Photo: Arve Kjerseim 1993.



Ill. 12. Photograph of plank no. 14 from the east taken for the inside: the sapwood is missing. Photo: Jan Michael Stormes 2008



Ill. 13. Uppermost in the picture of plank no. 15 from the east, the sapwood has been preserved and the outermost tree ring is from 1069: this is the youngest dated tree ring for the north wall.



Ill. 14. The picture shows the shortest of the exposed radii on the outside of the plank on a part of the carving that lies directly below the main radius. Normally the radius on the plank's outer side will have the most tree rings, but due to the abnormal growth pattern, the external radii were dated to 1054 and 1056 respectively. Photo: Jan Michael Stormes 2008.

shows that tree rings from this site do not run with the “natural” rounding of the beam, but turn inwards to the east. Hence the felling date could be the winter of 1069–1070, but it could also be one of the immediate following years.

This means that more than 85 tree rings were removed from the outer layer of plank number 14 from the east (ill. 11). Even the door leaf between the two planks is undated, despite several attempts.

Borgund stave church

At the request of the Society for the Preservation of Norwegian Ancient Monuments, samples were taken at Borgund stave church between 4 – 7. 2. 2003.⁵⁶ Three core samples were taken from the SE interior post in the nave. The analysis shows that the felling date was the winter of 1180–1181. Normally, a larger amount of material is needed to be able to determine the age of a church and so photographs were taken of 54 radii from 12 different planks in the north wall of the nave. It was assumed that the planks were contemporaneous with the post from which the samples had been taken.

The core sample that was dated to the winter of 1180–1181 has 70 tree rings in the sapwood. Plank 14 has an outer surviving tree ring from 1166, and has 52 tree rings in the sapwood. If it had also had about 70 tree rings in the sapwood as is the case with the sample



Ill. 15. Details of the outer surface of plank 14 showed by the help of a mirror. Photo: Jan Michael Stormes 2008.

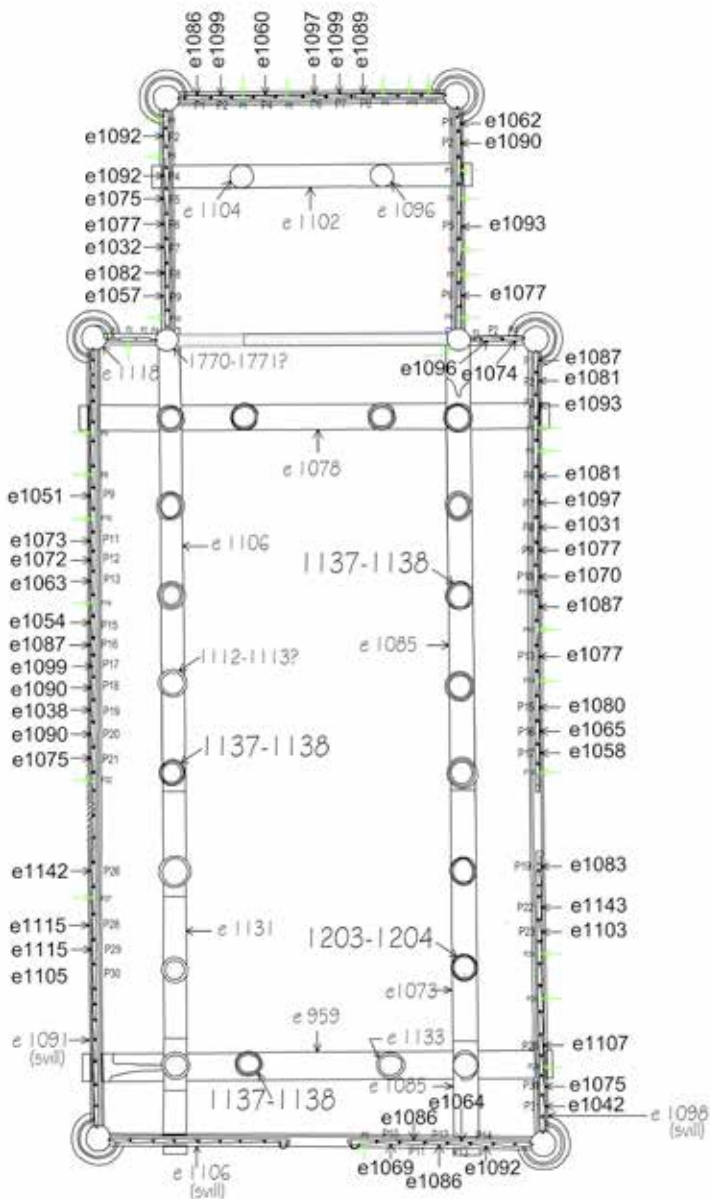
for the post, the felling date would be around 1184. Hence there is good reason to believe that the planks in the north wall are contemporaneous with the post.

Kaupanger stave church

The field work in connection with photographing the wall planks at Kaupanger stave church was carried out in September 2013.⁵⁷ The analysis of these photographs has helped to provide answers to the dating of a number of materials in the church (ill. 16). Three of the interior posts were felled in the winter of 1137–1138. These are the fourth interior post to the south counted from the west, the sixth post to the west, counted from the north, and the second post to the west, counted from the north corner. The outermost tree ring on the sixth stave to the north, counted from the east, is dated to 1136, but a tree ring may be missing due to very slow growth at the outer edge.

Four of the original wall planks may have visible parts of preserved sapwood. By using the sapwood statistics that build on some 150 observations of pine, a time spectrum for the felling date can be calculated, which shows that the felling date for the plank timbers need not deviate from the felling date for the posts in the winter of 1137–1138 (see table 7).

The majority of the outer wall planks can also be dated. None of these appear with certainty to contain sapwood. In order to calculate the felling date, it must be assumed that only the sapwood is missing in the dated planks. If an addition is made from the last meas-



Ill. 16. Plan of Kaupanger stave church with datings of the different construction elements. All datings are included after the church was extended. Undated construction elements are marked with green arrows. Drawing: Jan Michael Stormes.

ured tree ring and outwards, based on the number of tree rings in the heartwood, adjusted with a “standard adjustment” of 10 years from the heartwood to the first measured tree ring, an average value of a “felling year” of 1155 is obtained for the 21 planks in the chancel. For

27 planks in the nave the corresponding value would be 1154. These are minimum values, as some of the heartwood may also be missing. If the felling date is 1137–1138, these values must be due to the fact that we were not able to see the sapwood to the same extent as on the planks at Urnes and Hopperstad churches. Here, corresponding calculations give values that lie close to the expected felling date in relation to the bark-edge dating on other construction elements. Decorations on the insides of the planks at Kaupanger mean that there are only limited opportunities for visual observations of any traces of sapwood.

Table 7. Dated planks in the nave at Kaupanger stave church.

Plank	Number of tree rings in the core?	Dating of outer tree ring in the core?	Felling date in relation to sapwood variation Min-mean-max
Nave south plank 7 from east	124	1068	1097-1138-1173
Nave south plank 11 from east	96	1073	1113-1141-1175
Nave south plank 15 from east	83	1067	1105-1132-1163
Nave south plank 30 from east	91	1075	1088-1120-1149

The church has been extended to the west in the Middle Ages. Second interior posts in the west of the nave, counted from the north, are dated to the winter of 1203–1204. This can be confirmed by the new measurements, but based on one sample only. One plank in the nave’s south wall, plank 22 from the east, has some sapwood preserved. The felling date calculated in relation to the sapwood variation, gives the period 1168–1201–1235, and the planks may therefore be contemporaneous with the post.

The church’s extension to the west is the result of the original church being “sawn through” directly east of the western corner post in the central space. The whole of the western part, with parts of the original raft beams, interior posts and wall planks, was moved far enough to the west to allow space for two new intermediate posts to the south and north respectively. This can be demonstrated by the fact that the part of the raft beam to the south west comes from the same timber as the raft beam to the east which is original.

The corner posts connecting nave and chancel appear to be more recent. They do not have grooves for planks

in the nave's east wall and the chancel's north and south walls. The north post may possibly have been felled in the winter of 1770–1771.

Nils Brandt has also drilled into two floor planks that come from trees felled in the winter of 1861–1862.

Hopperstad stave church

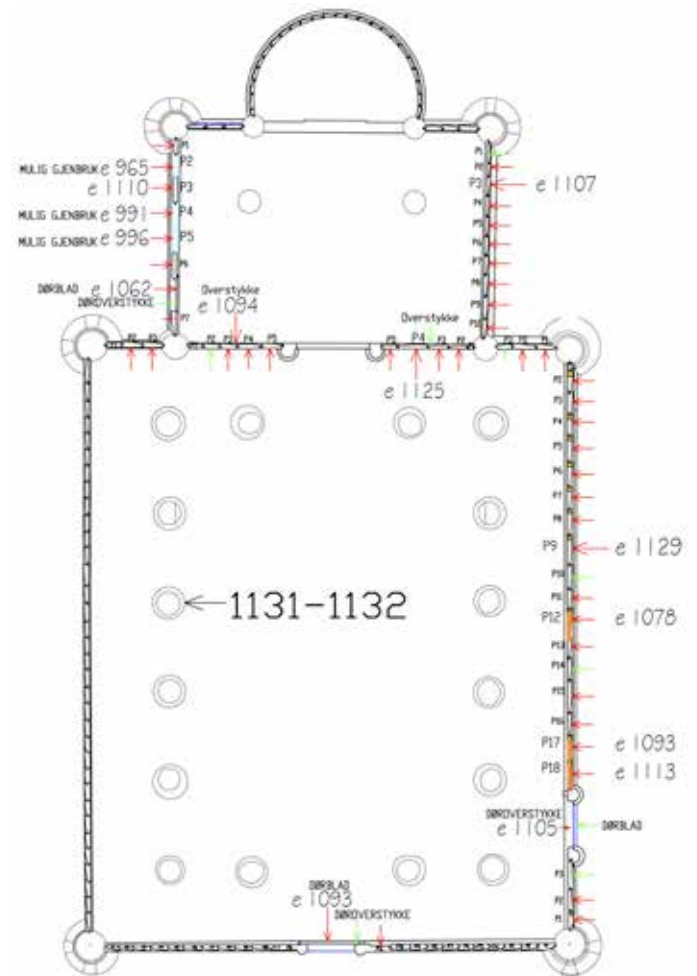
In Hopperstad stave church a core sample with bark was taken on 7. 9. 2011.⁵⁸ The sample was taken in the nave from the fourth interior post to the north counted from the west. It is 23 cm long and goes almost into the pith. The sample contains 191 tree rings, of which 52 are in the sapwood. The analysis shows that the tree was felled in the winter of 1131–1132. This indicates that timber for building the stave church was being felled at the beginning of the 1130s (cf. plan drawing ill. 17). This dating of the post corresponds with the dating of the planks, with the exception of planks in the north wall of the chancel, which may have been reused, probably from the earlier stave church on the site.

The shape of the planks in the north wall of the chancel also deviates from the other planks, as the outside forms a “wave contour” in contrast to the extant church’s “step contour”. Urnes stave church has a similar difference between the shape of the “old” and the “new” planks. The materials used in the extant stave churches at Hopperstad and Urnes may have been felled at about the same time or shortly after one another. The felling dates correspond with the churches’ stylistical dating.⁵⁹

Other dendrochronological measurement have been carried out using the photographic method and tree rings have been measured along multiple radii on 86 different construction elements in the church. The results are shown in the illustration (ill. 17). Here the field work in connection with the measurements was carried out from 5–10. 9. 2011.⁶⁰

Haltdalen stave church

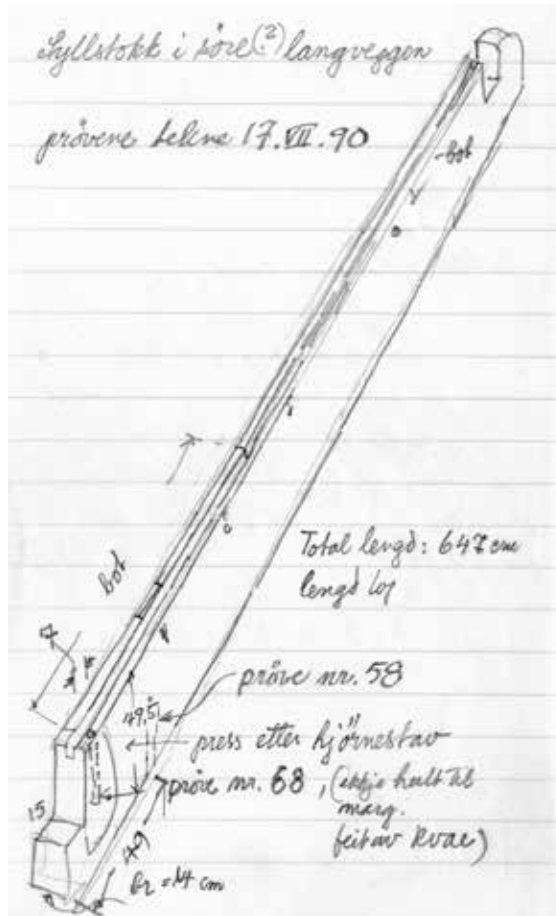
The church is now located at the Trøndelag Folkemuseum, Sverresborg, in Trondheim. In conjunction with the architect Arne Berg, samples were taken on 11. 7. 1990 from sills that have been replaced and which have been preserved at the Trøndelag Folkemuseum, Sverresborg.⁶¹ None of the samples had traces of bark or a definite waxy edge. The outermost dated tree ring is from 1163



Ill. 17. Plan of Hopperstad stave church with dates of the different construction elements. For reasons of space many dated measurements, marked here with small red arrows, have been omitted as much of the material is missing from the outer layer of the material. Undated construction elements are marked with green arrows. Drawing: Jan Michael Stornes.

on the sill beam which is assumed to be from the south long wall, cf. field notes dated 11.VIII.1990 drawn by Arne Berg (ill. 18). According to the notes, there could be a waxy edge, i.e. the last tree ring before the tree was felled at the site where the sample was taken. The felling date is therefore probably a short time after 1163.

A total of nine samples were taken from the church in 1990, but the rest had outermost surviving tree rings for the years before 1163. Given that it is uncertain how many tree rings are missing in the outer layer on the sill beam shown in the field notes (ill. 18), the felling date



Ill. 18. Sketch by Arne Berg in 1990 of replaced raft beam in Haltdalen stave church.

is assumed to be between 1163 and 1170. Until now this has been the approximate date of Haltdalen stave church, which was assembled from two stave churches: Ålen and Haltdalen.

The stave churches as an archive of building traditions and choice of materials
The building traditions from the Early Middle Ages has not survived in Norway. This is due in part to a reduction in building activity in the 1300s and 1400s. Written sources from the time when the oldest surviving stave churches in Norway were built are also largely missing. Hence studies of the original material provide an unrivalled opportunity to carry out research into building traditions and choice of materials in such old buildings.

Objects that survive from the Middle Ages in Norway are therefore extremely important for acquiring knowledge. Objects that disappear or are destroyed are lost for ever. Copies are no replacement for original material, and have no source value for buildings research. On the other hand, there is a long list of opportunities available for future research into the stave churches still standing in Norway, for example tool marks, variations in construction techniques and the types of forest where the timber was obtained. These in turn lead to questions about the extent to which it is possible to derive the criteria used in selecting building materials.

The precise dendrochronological dating that has been achieved for the felling date for the material has created a new basis for future research in this field. The felling date for timber from different construction phases can be determined and can provide an exact chronology for different construction phases. The work that has been carried out in recent years has made it possible to extend the dendrochronological analyses to include further study of the choice of materials made in connection with building the stave churches. The end of the Stave Church Preservation Programme is hopefully the start and not the end of this study as the opportunities to harvest the archive information that these unique buildings can provide are greater than before. As more datings become available, it is possible that the “biological archive” of the tree rings may cast new light on the human activities that lie so far back in time.⁶²

What characterises the materials chosen for building the stave churches?

The basis for all research is that results and conclusions must be documented and be capable of verification. Oral transmission is part of the cultural tradition and it is important to safeguard this, but it primarily represents the *opinions* of an individual and not knowledge based on experience going back to the Middle Ages. Long-term, professional, thorough, structured research, which can be documented through studies of the original material, is essential. For example, why have wooden buildings survived in the Nordic climate for so many centuries? Could this simply be due to good quality timber?

What is really meant by the word “quality” in relation to timber? Among the many criteria used to describe



Ill. 19. Inside of door from the north wall of Urnes stave church. The plank is from a pine tree that grew quickly in its early years and with many, often large twigs. Photo: Håkon Christie and Knud Krogh 1971.

high-quality work is timber with no or few twigs. Another criterion is plenty of heartwood and suppressed growth which results in narrow tree rings throughout the life span of the tree, and also a relatively high age.⁶³ There is a general agreement about what constitutes high-quality timber amongst experts. However, does this view correspond with the material that is found in Norwegian stave churches? It makes sense to start with Urnes stave church, as this has been studied the most; firstly through archaeological excavations under the church in the 1950s,⁶⁴ and then through many years' studies by the architects Håkon Christie and Knud J.



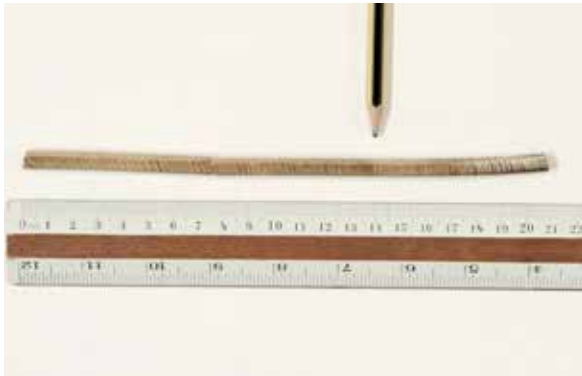
Ill. 20. The prow of what is probably a Viking ship has been etched into two of the wall planks in Urnes stave church. The white colour has been added more recently and makes the line more visible. Photo: Terje Thun 1998

Krogh, which resulted in the publications on Urnes referred to in this chapter. These also cover some of the dendrochronological analyses that have been carried out at the church.

The ornate planks on the north wall of Urnes stave church (shown in ill. 11), which gave rise to the concept of the Urnes-style, are possibly one of the reasons why the church was inscribed on UNESCO's World Heritage List in 1979. The same planks also have an inner side and in particular the key-shaped portal on the north wall is formed from a tree that was very quick-growing with many, sometimes large, twigs. (ill. 19). There are also plenty of twigs on the planks adjoining the door: these are the inner side of the ornate planks.

This material, dated to around 1070, comes from the present church's predecessor, known as the Urnes-style church, but it hardly meets the criteria that define high-quality material. Nonetheless it has not deteriorated due to decay or insect damage over many centuries.

With the reused planks in the north wall, the number of tree rings varies from 106 to 319, while the mean value for all the planks on the north wall is 207 tree



Ill. 21. Urnes stave church, raft beam from the nave, felled at the end of June 1131. The sample contains 149 tree rings in all, of which 59 are in the sapwood. The pencil indicates the transition from heartwood to sapwood. The sample shows wide rings for the entire lifetime of the tree. Photo: Helene Løvstrand Svarva 2015.



Ill. 22. Hopperstad stave church, 4th. stave from the west in the northern row of staves in the chancel, felled in the winter of 1131–1132. The sample contains 191 tree rings, of which 52 are in the sapwood. The pencil indicates the transition from heartwood to sapwood. Photo: Helene Løvstrand Svarva 2015.

rings. Hence there is little to indicate that suppressed growth with narrow tree rings was a criterion for choosing the materials for this wall.

On the contrary, it seems that the common element for the choice of wall planks is the dimensions, with relatively large trees of about the same width: in other words a practical choice. Might this tell us something about the type of forests close to the church, and in the surrounding area when timber was to be felled? Perhaps this indicates that as early as around 1070 there was little access to the type of forest that produced what is termed quality timber?

We do not know when or why a medieval ship was carved on to two wall planks at Urnes (ill. 20), but far down Sognefjorden it must be assumed that timber was also much used for building boats.

It is a possibility that as early as the 1070s there was no homogenous natural forest, and probably timber with the correct dimensions was selected from different stands of trees. The age of the planks in the north wall varies as mentioned: the oldest began to grow in the middle of the 700s and the youngest more than 200 years later. The trees from which the planks in the west wall at Urnes stave church are made, are on average 50 years younger than the reused planks from the earlier church. The fact that timber of an ideal quality was not available for the “new” Urnes church in the 1130s can be seen in at least two of the posts. Today this would be called poor workmanship: the posts were half-rotten

before they were used so that the dowel that goes down into the raft beam has now gone.

Other construction elements from Norwegian stave churches that have been analysed are sills, raft beams, original weatherboard roof panels and posts. The impression from these construction elements is primarily that these come from felled trees with dimensions that were required for the particular construction element in the church. Two core samples from the nave’s west raft beam at Urnes, which were felled around the end of June 1131 (shown in ill. 21), and the nave’s fourth post from the west in the northern row of posts at Hopperstad, felled in the winter of 1131–1132 (shown in ill. 22), demonstrate this. Both these samples have preserved traces of bark, which is not unusual in the materials used in the stave churches. Hence it is possible to see the whole dimension of the tree before it was felled and it shows that often the whole tree was used. Thus trees were chosen that had the exact thickness or dimension required for the relevant construction element. In this case, this applies to a raft beam and a sill that are about 45 cm in diameter.

Trees were used that had grown rapidly with relatively wide tree rings throughout the lifetime of the tree, including the final years of life for the sample from Urnes (ill. 21). The sample from Hopperstad (ill. 22), has narrow tree rings outermost but these appear gradually and are probably due to a natural process. No growth in tree rings has been shown that indicates an artificial

incursion to achieve “self-impregnation” in the tree.⁶⁵ The trees probably lived completely naturally until they were felled, and the choice of tree appears to be based on the dimensions of the tree.

In ill. 21 and 22 the position of the pencil points to the boundary between the heartwood and the sapwood, and this shows that a large part of the samples consist of sapwood. These two samples are typical of much of the material that has been investigated up to now using dendrochronology and which is described in the section on results above.

The age of different construction elements – and damage

In the Urnes church from the beginning of the 1130s the number of tree rings on the analysed elements varies from 78 to 242, with an average of around 170. This largely corresponds with the samples which up until now have been analysed in the other Norwegian stave churches. However, only a few stave churches have been studied in depth and many unanswered questions still remain. What has been studied so far points largely in the same direction as the analysis of the material from Urnes stave church.

The choice of timber was based on what was practical and available. On the whole, as at Urnes, the majority of trees that were chosen have between 150 and 200 tree rings. Only Reinli stave church stands out, in that the samples from the construction elements felled in the 1300s have an average of around 240 tree rings, while some samples have over 300 tree rings.

What about visible damage, of which there are many examples in the stave churches and in Norwegian timber buildings from the Middle Ages? Could this have been done intentionally in order to increase the tree’s self-impregnation? In the north row of posts in the nave at Kaupanger stave church, a large gash is visible on post number 5, counted from the west wall (cf. ill. 16). A core sample was taken from this post (ill. 23) for dating, but also to investigate whether the damage could be dated by studying the tree’s growth pattern. The core sample has an inner tree ring from 948, and an outer tree ring from 1112; at the very edge of the sample growth has almost stopped and the tree is dying, which indicates that it was felled an unknown number of years after 1112.



Ill. 23. Stave in Kaupanger stave church with damage. Photo: Jan Michael Stormes 1998.

The analysis of the growth, however, shows that the damage was inflicted some 140 years before the tree was felled. During the period from 991 to 994, growth reduced dramatically by more than 90 per cent. Thereafter the tree shows reduced growth with very narrow tree rings for the rest of its life. It was felled some time after 1112, and it is not impossible that this occurred at the same time as the other posts in the church which were felled at the end of the 1130s (see the results section for Kaupanger stave church). The damage, which is not dissimilar to that incurred by trees in a grassfire or if struck by lightning, occurred at the beginning of the 990s, long before the tree was ready to be felled and was probably not inflicted by humans. We do not know if there was a conscious decision to use the tree in Kaupanger stave church due to the damage but the post has, like all the other posts, remained dry in the church and shows no sign of decay or other weaknesses. The damage to the wood has thus not been of any significance for the preservation of the wood.

It is not difficult to find examples of decay in the stave churches. Over time, damp and rot have occurred (see *ill. 20*). To the left of the graffiti of the medieval ship there is clear damage caused by decay after a water leak. The material that has been standing in the stave churches and other medieval wooden buildings has remained dry and the application of tar at various times has been important: maintenance is vital for preservation. All wood will decay when it is exposed to moisture over time. This applies both to pine with a very high content of heartwood, which is characterised as high quality, and to plain ordinary, fast-growing wood – as found in many of the Norwegian stave churches.

The description of the choice of materials above can be documented and verified. Core samples and photographs of the wall planks have been archived at the NTNU University Museum in Trondheim, but the best documentation is the churches themselves, which still stand and whose witness cannot be overlooked.

Summary

Dendrochronological analysis is based on dating the tree ring pattern of an object of an unknown age; in this case a construction element from a stave church, by comparing it with a tree ring pattern from an object with a known age. Before dating can take place, a reference must be created in the form of a long tree ring chronology that runs from the present day and back in time.

The aim of the dendrochronological investigations is to provide an answer to the well-known question faced by every stave church guide: “How old is the church?” If good samples can be obtained with all the tree rings intact, the felling year of the timber can be dated and this can help in ascertaining the date of the construction process.

Through dendrochronological analyses, construction elements from a total of 22 stave churches have been dated and all the results have been presented.⁶⁶ The presentations are done in order of geographical location in Norway. The number of construction elements that have been analysed varies for each stave church. For some, the felling date has been analysed for just a few construction elements, while other churches have been studied in much greater detail. Thanks to the Stave Church Preservation Programme it has been possible to carry out a systematic analysis of almost all the material from

Hopperstad and Kaupanger stave churches, and partly at Gol and Borgund. Thorough investigations have been carried out at the extant Urnes stave church and on the reused materials from the “Urnes-style” church.

On the whole, trees with the most useful dimensions have been used for sills, wall planks or other construction elements. The trees from which the material is taken vary in relation to speed of growth. Some are fast-growing with few tree rings, while others have multiple, narrow tree rings, which indicates that this has not been a criterion for selection. On many of the construction elements the sapwood is preserved and this has no significance for the purpose of the relevant construction element: the durability is due to maintenance. All maintained timber buildings from the Middle Ages have probably regularly been given a coating of tar.

A good example is Finnesloftet in Voss, which comprises pine timbers which grew very quickly and were felled in 1295. Despite the fact that the building is located in an area with a high level of precipitation, it is completely free from decay, probably due to regular maintenance in the form of applications of tar. Neither the stave churches nor Norwegian timber buildings from the Middle Ages have timbers where the quality is significantly different to much of the wood that is growing today: core samples from standing trees across the whole of Norway have proved this to be the case.⁶⁷

Many questions have been answered through the Stave Church Preservation Programme, but many remain to be answered. What about Reinli, for example? Was the church that we see today built around 1326, or is the dating from the restoration of an earlier church? Another example is Rollag: three dated construction elements in the church are a good 200 years younger than anticipated, but the lack of tree rings in the outer layer means that the felling date cannot be determined. Is the whole church from the 1400s, or was an older church restored about 100 years after the Black Death? And not least, what about all the churches where only construction elements without traces of bark have been dated, such as at Torpo? When was this material felled?

There are still many unanswered questions, probably more than we are aware of today. So how shall we go forward? Could this book be the “seed” that inspires further stave church research in Norway? The Stave Church Preservation Programme and dendrochronology have shown the way.

6. THE ROLE OF THE CRAFTSMAN IN CULTURAL HERITAGE PROTECTION

TERJE PLANKE

The stave churches are dark and alien. This makes them attractive, but also repellent. In some ways they are incomprehensible, but the incomprehensible leads to questions, curiosity, doubt and unease through involvement and empathy. They never really get under your skin because they are so remote, so different. When we look at our profane vernacular building traditions, it is easier to experience a deep sense of continuity. Yet the stave churches provide no such strong, clear resonance. On the contrary we find an enclosing darkness. A dark self in a dark landscape, where no light has yet broken through. For we only have access to the surface of the building and not to the back of the construction elements or the surfaces between them.

This chapter is about how to illuminate and understand past actions and processes based on the craftsman's work. I am not investigating the knowledge of craftsmanship per se: we will rather discuss how the practices and perspectives of the craftsman can contribute to the research community gaining new understanding of these deep, heavy and yet noble monuments.

The craftsman investigates

In order to take care of our old buildings they must be maintained and repaired. To ensure long-term, responsible preservation of the vernacular architecture, we must therefore both develop and pass on the skills of the craftsman. The practical craftsmanship can be cultivated by ensuring that knowledge is created and transmitted

within the community. Alternatively it can be part of the formal training within the educational system. The Norwegian Directorate of Cultural Heritage, through its Medieval Project in the 1990s and the Stave Church Preservation Programme in the 2000s, has worked together with a group of craftsmen to increase the skills and knowledge of the restoration workers.

In the Medieval Project, the aim was, in addition to restoring the actual buildings, to rediscover and disseminate local, practical skills and competences.¹ The emphasis was on dialogue with the craftsmen and balancing *authenticity of material* against *authenticity of process*. The Stave Church Preservation Programme is an extension of the Medieval Project in this regard. A further aim was to increase the existing knowledge about the stave churches as a basis for research and the reconstruction of lost elements.²

In the Medieval Project, craftsmen were brought into the processes by cultivating the traditional aspect. The restoration work in this project has not been documented to any great degree and the project has not been evaluated.³ In the Stave Church Preservation Programme, in addition protecting traditional knowledge, it was also important to document the churches and to collect knowledge of craftsmanship that can be used in future research. Here too, the craftsmen have played a central role. Including carpenters in the deliberations, and listening to them at administrative level, have been important parts of the process. Actively involving craftsmen this way in order to create a source material, is a

way of bringing in new perspectives, both methodological and thematic.

Here I want to investigate the significance of the craftsman's practical experience and to look at how practical knowledge affects the way craftsmen work when they repair and investigate stave churches. The reports written by a number of craftsmen, who have worked on projects under the auspices of the Stave Church Preservation Programme, have been important to me in this respect. It may seem ironic that I am relying on the reports rather than taking part in their practices. My aim, however, has been to investigate what remains as documentation material after the actual work has been completed. It has not been an aim to evaluate the reports, the quality of the work or the Stave Church Preservation Programme as such, but rather to look at the distinctive character of the reports in order to understand more about the relationship between the craftsman, the administration and academic research.

There are four basic types of reports: condition reports, works reports, major documentation reports and research reports of a more experimental nature. The reports have been filed in the Norwegian Directorate of Cultural Heritage's archives but have not been published.⁴

Condition reports as a source

I have gone through six condition reports. These comprise a non-systematic selection of the reports that were drawn up in connection with the Stave Church Preservation Programme. The condition reports cover the decay at Eidsborg, Lom, Urnes, Haltdalen and Hedalen stave churches. They provide a description of the parts or elements that have been damaged, and the causes of the damage are discussed. Some of the decay is documented and disseminated with the help of pictures. Proposals for measures are described, and in some cases are referred to the Directorate of Cultural Heritage, which decides which solution is to be used.

A typical characteristic of the condition reports are that they are analytical. Firstly a building's condition is documented. This is determined directly by using the senses: sight indicates that there is major wear and tear. Knuckles or the tip of a knife will identify rot. Fingers will tell if the area is dry or whether there is moisture. The hand recognises whether a part is loose or firmly

in place. These methods scarcely get a mention in the reports. Analysis follows in the next round. What is the cause or reason for the damage is more implicit, but is revealed primarily by the measures that are proposed to counter the problem.

The condition reports are characterised primarily by the fact that the administrative bodies are driven by decay. These reports say more about our modern maintenance procedures and administrative choices than about the origins of the churches. The fact that the reports are written by experienced restoration craftsmen, or are based on their inspections, ensures a high degree of accuracy and professional quality. When the same craftsmen later implement the work, they will have their own descriptions confirmed, and also to some extent dismissed. In this way they can develop their own experience by alternating between observation, verbal and physical work. On the other hand, one could end up in a "state of confidence" where one only sees things from one's own perspective and one is not confronted with perspectives from other professions. Craftsmen have a physical interaction with the monuments and come forward with their own opinions on the causes of the church's state of preservation, but they also want direct guidelines for the work.⁵

Clearly these reports are not science *per se*. They are documentation with an analytical character. However, the experiences that are described can become science if they are questioned, systematised and published.

Works reports as a source

The works reports that I have studied are from four different projects of different character. These involve the church wall at Lom, shingles at Eidsborg and Borgund, and roofing works at Reinli stave church. The work reports describe what has been done, with the emphasis on what has been replaced and why. There are few descriptions of the work itself.

Replacing the shingles at Eidsborg stave church led to a report on the process of making and laying shingles.⁶ The process of cleaving and shaping is done using a hydraulic cleave and shaping them with an axe. The process is explained with the help of illustrations and short written descriptions. The connection between the source material, consisting of old shingles, and the choice of material and the methods used, is shown in the form of clear statements.

The right side (pith side) should face upwards. The upper side of the shingle should be hewn as little as possible. All thinning of the shingle should be done on the underside. If the shingle is twisted, it might be necessary to hew a little on the upper side as well. The upper side must nonetheless be levelled in order to lie well with the shingle above it. This can be seen on old shingles. The upper side is shaved as little as possible. The shingle should be cut to an even width. All the sapwood should be cut away.⁷

The statement “This can be seen on old shingles” is all the reader has to rely on with regard to a justification for this way of working. The mind-set behind the use of cleaved, rather than sawn shingles, is based on two reasons. Firstly, cleaved wood will be more water-repellent. Secondly, it is worth trying to copy the old working techniques. When discussing working techniques, it is tempting to ask questions about the use of tools referred to in the report. An example here is the use of long-edged broad axes to hew the shingles. It is not easy to ascertain which types of axes were used for the first shingle coverings in the different churches. However, it is likely that broad axes were not used to form the shingles, as we now think that this type of axe came in to use in the 1700–1800s.

When it comes to replacing shingles, photo documentation makes up the reports together with brief descriptions.⁸ Where there are problems with decay, the cause of this is shown by referring to material quality, constructional errors or lack of maintenance, while choices are described and justified where these deviate from the solution that is being removed and replaced.

I see the ideology behind this as being that the building is regarded as its own documentation. Straight-forward replacement, where the same type of material or technique is used, is derived from this way of thinking and hence no further description is needed other than to say that the work has been carried out. More recent shingles, of sapwood and tangentially-sawn wood, are replaced with new shingles with a material quality more like the original. Here a choice is made to reinstate the quality to avoid repeating errors from previous repairs. In the report, the craftsmen ask for the Directorate of Cultural Heritage’s evaluation of the work on repairing valley gutters, before continuing with similar work on the other stave churches.⁹

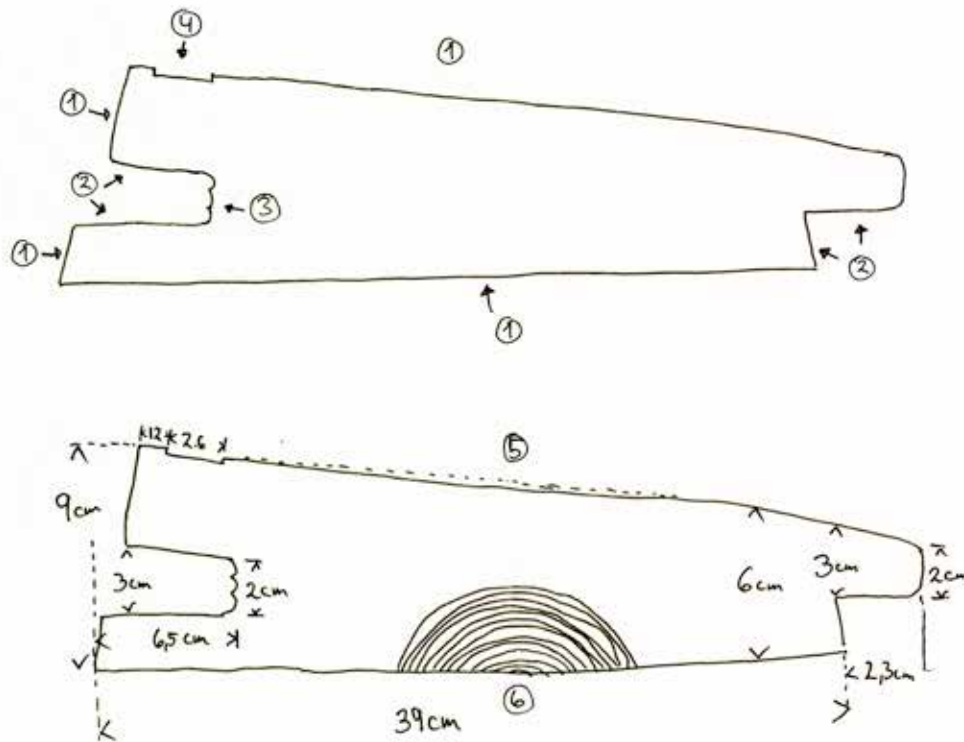
For the project at Reinli stave church, a log book was kept.¹⁰ Here the craftsmen give brief but precise descriptions of their daily work. Through these texts it is possible to come close to the decisions and debates that were going on. Without the same use of pictures as in the other reports, it is difficult to understand the reality of the discussions that are referred to. The use of drawings and photographs in addition to the log book is unfortunately inadequate. They are used in the works report on the roofing works at Reinli.¹¹ The report consists of 33 pages, largely comprising photos and brief captions.

Documentation reports as a source

The documentation report “Nore og Uvdal stavkirker. Tømmerkvaliteter og materialframstilling” (“Nore and Uvdal stave churches. Timber quality and preparation of material”) is of a completely different genre to the condition and works reports.¹² In these reports the church is studied closely, not based on what is wrong but on what is old. The study of Nore and Uvdal stave churches was financed by the Directorate of Cultural Heritage in order to acquire further knowledge regarding the materials and craftsmanship of the churches. The source study was therefore carried out based on craftsmen’s experience and contrasts to some extent with the knowledge that has been circulating regarding research into stave churches and the Middle Ages. The aim was to reveal some characteristics behind yesterday’s understanding of the use of materials and to pose hypotheses about the actual craft processes.

The registration work included geometric measurements of construction elements, biological posts with qualities of the materials and interpretations of tool marks to reveal which tools were used and possibly how. Cracks due to the wood drying out can provide an understanding of whether the tool was used on wet or dried timber. The search for small tool marks has been the object of special attention. The documentation work has been followed up with practical tests where work has been done on the cross-section and on the production of wall plates. This has not previously been documented to any great extent, and at the same time it is vital in understanding the stave construction.¹³

The form of the report is factual and flows well when it explains the methodology and it also refers to pre-



Documentation drawing of a wall tile at Nore stave church. 1) shaved by inshave, 2) hewn with an axe, 3) formed with a hooked pull-chisel, 4) made with profile inshave, 5) outside, 6) inside. Original drawing by Hans Marumsrud and Kristin Åmodt, undated, redrawn by Terje Planke.

vious knowledge about the church. Material quality is explained with diligence and accuracy:

The trees that are used to make the wall plates vary from straight-growing to ones that have twisted a little to the right. The width of the tree rings varies from around 1.6 mm to about 0.7 mm per year. The total age calculated for a wall plate is about 300 years. The greatest width is on average 45 cm, but varies from 30–60 cm. Narrowing varies from 0.4–3.5 cm/m with an average of 1.7 cm/m. The length of the top shoot varies from 10–38 cm/year with an average of 24 cm/year. The wall plates are made from logs split into two: only two wall plates are made from each log. The wood closest to the pith is hewn away to a depth of around 2.5 cm. The right side, or pith side, always faces inwards into the church. Because the width of the wall plates follows the way the log narrows, the root end must face both up and down.¹⁴

A precise account is thereby given of the quality of material, growth rate and rotation, location of the pith and whether the root end is placed up or down. In my opinion, tables with the material together with an explanation of what has been investigated would provide greater transparency and compliance than a collection of conclusions. The interpretation of tool marks is also presented in the report in the form of conclusions and statements, rather than showing the actual analysis. Together with a cross-section of a wall plate, it annotates and illustrates which tools were used where on the wall plate.

The use of materials in different places in the building and at different times is compared against different concepts of quality.¹⁵ The ability to read the quality of the material can be found in the dialogue between craft-based questions that build on long practical experience, and a deep understanding of wood technology. This is an exciting hermeneutic of a polycentric nature, i.e. that the analysis depends on cooperation between bearers of knowledge from different traditions in order to arrive

at a conclusion.¹⁶ Regarding the tool marks and the use of tools, the analysis is lifted by the dialogue between the user of the tool and the ability to understand and describe the qualities and characteristics of the materials.

The report distinguishes between facts and interpretations in a way that makes it difficult to see the connections. Furthermore the facts, which are summaries or synopses of multiple construction elements, are referred to in a way that makes them difficult to identify. For me as a reader, it is difficult to penetrate the text. I do not get any impression of the material that lies *behind* the statements. The text is left alone, to speak for itself, without justifications. In the discussion section, there are a number of important and exciting reflections. Here again it is the individual's credibility, rather than the explanations in the text, that lead me to believe both the content and the conclusions.

When it comes to the description of the use of tools, the report contains a short description of the tools that were used and a description of some simple trials. The point of the trials was to investigate the consequences of certain elements of the structure being made from green wood. It is quite incredible that it has taken until the 2000s for research into the Norwegian stave churches and building traditions to discover this. If one is used to traditional tools then it is perfectly natural to work with green wood.

The fact that the whole field of study has been based on the paradigm of dried material being used shows how far we have come from the traditional standpoint. What is exciting here is that it shows that hewing and shaving was done on green wood and that joining was done in a dry state. I have no reason to doubt the conclusion, but would have liked to have seen pictures and other documentation of the objects upon which these statements build. The need for a detailed presentation is very high, as these types of conclusions gain credence in the field by being passed on and the reports being cited.¹⁷ It should be expected that the source study that forms the basis for the conclusions is transparent.

It appears that some of the measured wall plates were taken from the church at an earlier point in time. This is the case for the wall plates that are shown on the front page and throughout the text of the report through the measurement work. The fact that these elements are no longer part of the church is only made clear in the appendix.¹⁸ Thus it appears as if the most important

parts of the report are no longer listed or are part of the legal building, but are stored somewhat haphazardly at the vicarage. These elements, which are no longer "*in situ*" are the elements that are of greatest significance as source material for the documentation and research work. This is worrying.

The way construction elements are cared for is random and unstructured, both within and outside the Stave Church Preservation Programme. Currently only the Norwegian Folk Museum has an adequate depo of construction elements for the purpose of preserving such elements for study.¹⁹ On the other hand, there are many stave church elements in various Norwegian villages. There is a high level of awareness in the craft community of the knowledge potential in these "moveable objects" from both extant churches and churches that have been lost.²⁰

Research into such moveable objects is stronger in archaeology than in building preservation. The archaeologist Harald Bentz Høgseth has looked in depth at the methodology around deriving knowledge of craftsmanship from construction elements through source studies.²¹ Høgseth criticises the fact that archaeologists do not manage to handle and preserve construction elements well when looking at the potential for research into craft techniques. Nonetheless, building preservation can take inspiration from archaeology and the museums on how to preserve and carry out research on moveable construction elements.

This example refers to a more fundamental problem, namely that those of us involved in building preservation do not plan research projects where we can go *behind* the surfaces of the building and dismantle them in order to acquire knowledge. This can be compared with the archaeologists' research excavations where a cultural heritage context is destroyed in order to acquire knowledge about the artefacts and their context. Such excavations take place within the auspices of the Cultural Heritage Act without any threat to the material of the past other than the archaeologist himself. This is comparable with a listed cultural heritage object being dismantled and rebuilt in order to acquire knowledge about the craft techniques used, to be able to build a proper reconstruction or copy; or at least to dismantle elements in order to study them further.

The Stave Church Preservation Programme is, however, a purely administrative project. What is investi-

gated through the programme is a direct result of what has been destroyed or threatened. We can narrow this down by stating that the research is driven by decay and is opportunistic, and on the craftsmanship side in particular, research has so far been absent.²² Before the Stave Church Preservation Programme, the closest I can find to what could be defined as research into craftsmanship on medieval stave constructions, is Stig Nordrumshaugen's undergraduate dissertation on a barn in Hardanger with posts shaped by using the "*sprettelgje*" hewing technique. This is a hewing technique used to shape timbers, often leaving a fish bone pattern in the surface of the wood. According to Nordrumshaugen, the material could come from a guild hall rather than from a stave church.²³

A report is also available that deals with "*Stavekirkenes enkelte deler. Beskrivelse av opplysninger funnet på kvar kirke*" ("Individual elements from the stave churches. A description of information found at each church").²⁴ Here, Hans Marumsrud's work of some 100 pages, where text and illustrations deal with each element in turn, is based on the large amount of material collected from the restored stave churches. Here it has been possible to go into the repair zone while the work was taking place and document what lies behind the usual surfaces. The report begins with the foundations and goes on to cover raft beams and sills, and ends with the ridge piece and traces of scaffolding. I have read Marumsrud's report in depth to study how floor boards, wall plates and the wooden roof sheathing are treated. The catalogue section gives a good insight into the extent of the material.

The information which deals with each individual element is somewhat random in form in the way that it focusses on what is held to be to be uncommon or abnormal. The report's catalogue can act as a good search tool for the photo data base with pictures from the whole set of material. I suggest that the database could support the individual interpretations. Without the catalogue, the illustrative material will be of much less value in future research.

Practical experiments

In the autumn of 2002 and the winter of 2003, a number of practical experiments were carried out, financed by the Norwegian Directorate of Cultural Heritage.

These are described in a 12-page report. Here a study is made of the theory of "the connection between moisture in the wood, the shape of the wall plates and the composition of the wall plates" partly through creating a test wall.²⁵ The theories are all based on the previously mentioned studies of dry cracks, tool mark fractures by dry cracks and roughness on processed surfaces. Expansion and contraction on a wall with 20 wall plates will correspond to about 7 cm if a 1% radial change as a result of seasonal changes in humidity is calculated. Standard tongue and groove in the sides of the wall plates could lead to major damage in the building and could result in a lack of diagonal support.

According to the hypothesis, the wood would be compressed at the contact points due to the slanting surfaces and will secure the wall's characteristics. In the experiment we follow the building of an experimental plank wall to find out the movements which the wall undergoes. The processing of each plank was done mechanically but the surfaces were worked using hand tools. The aim of the experiment was to understand the construction and how it could take up the dynamic without destroying itself or this resulting in large cracks.

Another report describing practical experiments is a 28-page long description of "*Verktøy som kan vera brukt under bygging av stavkirken*" ("Tools that may have been used when building the stave churches").²⁶ Here different tools are referred to that were used in connection with different projects at home and abroad, while aspects of use and traces of different tools are discussed. The theme of *sprettelgjing* (see above) is given special attention. Here Marumsrud himself carried out a major, long-term study on revitalising the hewing technique and the tools behind it.²⁷

According to the investigated tool marks, a narrow axe with an edge as small 15 to 25 mm and a depth of 25 cm and a felling axe must have been used.

Here the connection between the content of the report and the findings is relatively weak; it points to sources which are not made visible and the results remain hanging in the air to some extent. It is possible that this is due to a lack of illustrations, but I feel the analysis should come from the material and not, as here, where the analysis is primarily illustrated using existing photographic material.

Another experimental piece of work is the project to reconstruct stave frames at Lom stave church.²⁸ Here,



Side light is important for highlighting the relief created by tool marks. However, it can be difficult for the untrained eye to read and understand such traces. Photo: The Stave Church Preservation Programme 2002.

Sverre Sørumsgård has worked together with Jon Godal and Anders Frøstrup on testing out twisting and winding as methods for erecting the stave framework for the church. The report is systematic and pedagogical with a clear theme. Statements, sources and descriptions of the experiments are closely linked to a convincing list of arguments.

To summarise the documentation material and the experiments, we can say that research into craftsmanship has great potential. However, systematic cultivation and development of the methodology and the field are required in order for the full potential to be realised. In spite of the fact that the texts are in the form of unpublished reports, and not articles, they contain important information about a number of different aspects which have not previously been studied systematically. The condition reports have analytical sections where they combine the characteristics of the damage with the underlying causes, and put forward suggestions and measures for repair.

The documentation material is suitable for comparison and takes us behind the surfaces, but can be too difficult to penetrate. The report shows that the practical experiments are a useful way for discussing and understanding source traces and finding ways to explain working techniques and procedures. As Gunnar



By trying out different tools and creating tool marks it becomes easier to understand the old traces. We find that the edge, and the humidity and characteristics of the materials affect the result. The picture shows a spoke shave that goes together with the hewing process. The more recent planes with a flat sole belong to sawing technology and modern carpentry. Photo: Kristen Åmodt 2002.

Almevik says the investigation is based on practical experience.²⁹ On the other hand, it does not appear as though the practice of craftsmanship has a clear basis in relevant academic research, primarily because there is no research upon which to build.

There are two things lacking; firstly, a greater connection between the material and the conclusions so that the interpretations rest on the material and not on the reputation of the practitioners; secondly, a more in-depth study of the traces in each individual case: which tool, not as a basic type but as a specific tool, could have been used to create which traces, and which techniques could have been used.

From my point of view, this is a possible way ahead: in order to say something about the level where I think current and future craftsmanship research should lie in relation to the field of cultural heritage administration. If this level is to be reached, however, this requires that contracting authorities facilitate this type of work, not least in order to cover the costs. In this respect, the Stave Church Preservation Programme is an important, major step in the right direction, but it is still just one step along the way.



In the winter of 2015 a two-week practical seminar was organized on the process of producing roofing for Haltdalen stave church at Sverresborg. The process of cleaving the logs was based on the tradition of Roald Renmælmo and Konrad Stenvold from Målselv. The seminar investigated the practical side of the process from the forest to preparing the roofing boards, jointing and whittling of wooden nails. Not all logs are easy to split. Even this devil finally had to give in to axes, wedges and sledgehammers. Here Roald Renmælmo holds a narrow axe for cutting the fibres that are crossing over. Blacksmith Øystein Myhre is on site to learn more about how the tools he makes can be used and improved. Photo: Terje Planke 2015.

Different perspectives

We will now take a step back and look at some of the context surrounding the work of the craftsmen. The Norwegian Directorate of Cultural Heritage's Stave Church Programme began in 2001. The main aim of the programme was to make a concerted effort to achieve a long-term, manageable state of preservation for each individual building. The process for each object involved surveying the building in depth and drawing up a condition report. Measures were then evaluated and selected. The main work consisted of implementing the measures. In this phase, new factors and elements came to light which meant that new information had



While working, the two experienced hewers, Siv Holmin and Hans Marumsrud exchange experiences. Siv Holmin is using an axe reconstructed from a medieval model from Fron in Gudbrandsdalen. Hans Marumsrud uses an axe reconstructed in a style used in north-western Russia. This log was split by band saw prior to hewing, giving the hewing primarily a decorative function. When splitting the logs by axe, the work is different in that the primary task is to remove wood. The hewing marks then become a result of the work and require more skill. Photo: Terje Planke 2015.

to be taken into account. However, the programme also ensured that the objects were documented more thoroughly, in parallel with the work being carried out.

The age, history and structural features of the churches have led to relatively complex processes where access to different types of knowledge is required. As with all other similarly administrated projects, the individual church then becomes a meeting point for a number of individuals with different backgrounds and experiences. We can identify some of the different roles. The owner (the State Church, The Society for the Preservation of Norwegian Ancient Monuments or a museum), the administration (The Directorate of Cultural Heritage) and those carrying out the work (the craftsmen) have three different roles, standpoints and interests. A fourth role is the role of the researcher which is both influenced by and influences the way the churches are seen and understood.

All officially administered projects carry the potential for conflict. The first conflict comes in the cut-off point between the formal power and the actual knowledge. Here we find people and institutions with different formal powers. The knowledge, for its part, is distributed unevenly across this landscape. Behind the roles we find

various different positions with associated hierarchies of values. I think it is important to look more closely at these viewpoints to understand how the field of administration functions.

Texts, objects and action in the hierarchy of the researcher and the antiquarian

If we study the scientific field surrounding stave churches based on our practices, we can see that the written word is positioned uppermost in the hierarchy of values. Texts and descriptions of the world have value-related precedence. Drawings, photographs and models lie at the next level, ahead of the actual object or building. Actions lie at the bottom. They are allocated the lowest value within the scientific perspective.

The background to such a set of values lies in a bound rationality which is self-confirming. A text can refer in a precise way to other texts. We quote longer or shorter excerpts and refer to their origin by author, year and page number. This way, we are building verifiability. The whole is confirmed by the publication indicator system. If you do not publish texts you will never be a researcher. Within stave church literature, the text orientation appears to be extreme, where “everyone” still refers to Lorentz Dietrichson, both in descriptions of the individual church and in more typological reasoning.³⁰ We can regard this troublesome legacy of Dietrichson as a parallel to “the Greek burden” where some prefer to go to the old philosophers rather than the object itself when trying to understand fundamental phenomena in the world.³¹

Drawings, photographs and models also have their value and function in research. They accompany and support the arguments but are not as fluid as the quoted texts. Based on this practice, however, drawings are easier to communicate than the object itself. The building is always *in situ* and is difficult to take with you through time and space, and this makes the opportunity for annotations and explanations difficult.

Documentation drawings are also robbed of all other dimensions: they have undergone interpretation and a purification of perspectives which makes them more homogenous. This is in contrast to the object itself which is constantly changing its meaning. In the stave church context, we have a small group of churches which have been moved for the purposes of preserva-

tion and administration. Gol (The Norwegian Folk Museum), Haltdalen (Sverresborg Folkemuseum/ the University Museum) and Garmo (Maihaugen) have all suffered a similar fate. By being trapped in museum collections they have become the object of revision, reconstruction and literary works. But they have also been reduced to objects of dissemination.

The actions for their part have an even lower value in the scientific hierarchy. At times they can form part of a methodology, through careful descriptions. However, the craftsman’s work is not itself part of the knowledge repertoire that creates the researcher’s understanding, interpretation or is included in our descriptions.

Building conservationists and particularly those who work in conservation administration have, in my view, a different hierarchy of values to that of the researcher. The administration of the listed cultural heritage is, from a legal point of view, enshrined in the Cultural Heritage Act and the attribution of values takes place in an interplay between the legislation and conventions for administration which have grown into the cultural heritage profession.³² The Directorate of Cultural Heritage has overall professional responsibility for the administration of the listed cultural heritage, but comes itself under the Ministry of Climate and Environment. If we were to try to describe the administration’s hierarchy of values, I find some common characteristics but also some marked deviations from the researcher’s values. What research and administration have in common is that the actions and the fluid knowledge have, for the most part, a low status. For research, illustrations in the form of drawings and documentation material are slightly higher up the line, while for the administration it is the object itself which is uppermost in the hierarchy.

We can say that for the cultural heritage administration, the stave churches, the objects themselves, are “sacred”. The Cultural Heritage Act requires cultural monuments to be protected as part of our cultural heritage and identity. Preservation shall safeguard both the scientific source material and the dissemination potential which lies in the cultural heritage object.³³ For the administration, however, the text has no value *per se* (unless it is a rune inscription or a painted text on the church wall). The function of the text is to add value to the objects or to set the context and the object in time and space.

The craftsman's hierarchy

The craftsman's hierarchy is based on different perspectives. Here the emphasis is on completely different factors. In the craftsman's training there is an emphasis on production and (re-) creating objects. For the restoration craftsman, the objects of the past collide with current requirements and standards. The work is done based on a dialectic between one's own experiences and the norms of the tradition on the one hand, and more formal legislation, such as the Planning and Building Act, technical descriptions and branch norms on the other. Many restoration craftsmen have a general professional background. Some end up in restoration work because they have a fascination for tradition and building customs, or see an interesting niche or prefer a different working rhythm.

The point here is that craftsmen do not have a single set of values which is transferred through specific professional training or a clear administrative tradition. Nonetheless, there is one clear fundamental characteristic: the action dimension is central to practising craftsmen, and this is just as strong and important as the academic orientation towards texts. In the majority of craft environments, it is a question of being accomplished, synonymous with pride linked to being precise and productive. Here the action lies uppermost in the hierarchy and forms the starting point in an egalitarian structure where the craftsman who is seen as the most accomplished has the power. The object – in the form of a complete, restored, solid product – is also of high value. Drawings have a value as a source or form of communication, but they are generally too superficial and downscaled to have full value in the hierarchy.

Texts and descriptions of the world have the lowest value here. The text tradition lies a long way from the objects and the processes, but can be used actively to keep processes, subjects and documents in order. Above, we have seen that work diaries are kept to keep track of working hours, movement of materials, sources and choices that are made, and that various reports are written. However, this work is formed to a large extent by the client's requirements and is relatively random in form.

After 2007, when the Norwegian parliament ratified the "UNESCO Convention for the safeguarding of the intangible cultural heritage", traditional crafts could be regarded as an administrative discipline that

comes under the Ministry of Culture and the museums. However, a clear administrative field with lines of responsibility or understandable practices has not developed.³⁴ Responsibility for this fluid knowledge lies with the individual, and to some extent with the contracting entity and the companies or institutions where the craftsman works, in the form of voluntary, extended social responsibility.

Focusing on the surface

Here I have presented – in caricatured form – three different positions. In different projects, these hierarchies of values will meet in different ways, based on who has ownership and the power of definition in the individual projects. In the Stave Church Project, the formal and actual power lies with the Directorate of Cultural Heritage. The research environments and the administration have over many years had a close co-existence and they have many characteristics in common. Thanks to the focus on objects in the legislation and the administration, the stave churches have been preserved, and, thanks to the research input, we have a general understanding of the churches in the form of categorising and theoretical texts.³⁵

However, by connecting the academic hierarchy (the text and the drawing) and the cultural discipline's methodology (look, don't touch) with the administration's perspectives (sacred objects) we have a situation which is primarily taken up with a single element: the surface. The surface can be seen, documented, disseminated, discussed and referred to, but is essentially different from the inside where the craftsman directs his attention.

The element and the surface have, in a cultural history context, been studied from two different perspectives. The primary interest lies in describing the particular element's extent or design. An element can be composed of several different parts. While the art historian compares a number of elements based on their visual context, the architect would rather look at the elements' connections.

The architect and archaeologist Knud J. Krogh discusses the design elements, while the architect Håkon Christie describes the building "joint by joint".³⁶ Surfaces can be generalised by sorting them into types or by making architectural historical comparisons through time and space in order to understand cultural processes

as evolution and diffusion. Christie refers to a kind of organic context, as though it were a skeleton. In his conscientious and detailed descriptions, he makes a significant point out of the elements' constructional connections. However, the text is free of any attempt to understand the pattern or the deeper functional connection between the parts.

If we take a step back, it may seem as if the researcher and the administrator ideally want to gauge each other but do not want to get directly involved in the other's field, as they can carry on side by side without coming into direct conflict. The perspectives of the researcher and the administrator thus live in relatively peaceful coexistence and can often act symbiotically within one and the same person.

Constructive conflicts

The meeting between the administration's and the craftsman's perspectives is not always equally peaceful. It may simply be that one person is carrying out the physical work, and another is defining what should be done. These different roles have different sets of values associated with them. The conservationist has an idea about authenticity which looks backwards and regards the object as something sacred. The craftsman looks forward, to the results of his work. Moreover, the skilled craftsman will want what remains once he has finished his work to be strong and beautiful, because what remains is a testimonial to the person who has done the work. These are two main characteristics which come into conflict.

Put simply, we can say that the restoration craftsman will tend to replace more material to ensure a uniform, strong construction which takes the statics of the building seriously. The conservationist, on the other hand, seeks to make the minimum of incursions in order to preserve as much of the authentic material as possible "in situ".

This points back to the legislation and different traditions. When something is being taken out of a listed building, it is, from a legal point of view, no longer listed. Within this way of thinking, the only certain way to preserve source value is not to take the construction element out of the building. This question is worthy of a longer debate on authenticity, or a discussion on source value and experience value based on the Cultural

Heritage Act. I shall not do this here, but simply note that the conservationist position focuses on preserving as much of the old material in situ as possible and that this perspective systematically collides with the craftsman's view, again and again. Furthermore the situation is characterised by a clear power perspective.

On the one hand, the craftsman has great power when carrying out work in conservation. A client will often leave things to the craftsman's understanding of the situation. On the other hand, we could say that the craftsman does not have power of definition in modern society. He does not take part in the way rules and systems are drawn up for the way buildings are designed. This knowledge is monopolised by architects and engineers. The craftsman acts more as a subcontractor within a knowledge system which is defined from a technical and cultural standpoint.

The craftsman and the conservationist have different sets of values, different expertise and different goals. The craftsman thinks, for example, that the conservationist does not take the building's integrity or stability seriously, and is not really interested in connections. The conservationist, on the other hand, thinks that the craftsman is not sufficiently concerned with preserving the authenticity of the fragments.³⁷ For the craftsman it is the back, and what lies *between* the elements which are most important in understanding the construction and the processes that lie behind it.

The descriptions above are caricatures. They highlight systematic perspectives but are not universally valid. For example, we can recognise the same relationships across, or within the different groups. There will always be some conservationists who adopt the craftsmen's perspective, and some craftsmen who work from the viewpoint of the conservationist.

En route to relationships

If we look at the relationship between the craftsman and the researcher, we will see some other characteristics. The researcher of cultural history has different opportunities: to study a feature, to study the connection between the features (relationships or the whole), to make comparative studies and to study processes. However, the methodology means that principally it is the surfaces that have been available for research. The cultural history researcher's gaze has focused on the aesthetic

features. The art historian sees the surfaces. Here, the concept of style has become the essence of the science, as style is both a method for dating and a good way to discuss cultural contact and development.³⁸ The architectural historian focuses on constructional features. This direction tends to group construction principles such as design, extent and to create measurement rules.

In caricature form I have shown that the craftsmen's standpoint and perspective are systematically different to the views of the other professional groups: the researcher and the conservationist. Little research has been done into the craftsman's perspectives in building traditions concerning the stave churches, and the craftsmen have carried out little research from their own perspectives. I would argue that many craftsmen have contributed to much of what has been published as research, but they are seldom credited in publications. However, the craftsman and the researcher can work well together in a mutually-dependent relationship.

Now that research into craftsmanship is in the process of establishing itself as a discipline, however, we see that new perspectives are arising. Attention is moving from surfaces and aesthetics to relationships and processes. Whereas the researcher looks at surfaces or architectural style, the craftsman with his experience looks at the surfaces between the elements, and the process of taking wood away. The action is momentary and the contact surface is inaccessible. It is not possible to study the contact surfaces and the actions without taking the elements apart and revitalising the work. Hence it will normally be the craftsman who has access to this situated knowledge, because it is the craftsman who uncovers new traces by removing layer upon layer. And it is always the back, the underside and the area in between which have the best traces and the most exciting information about the processes.

A remote past, dark buildings

It has been maintained that traditional craftsmen have a specialist knowledge which enables them to understand the building traditions of the past.³⁹ To some extent this is correct. However, at the same time the stave churches, for example, are so remote to us, and are so dimly lit, that it is difficult to understand them. Hence we need a methodological approach that reflects this great distance. Perhaps this could be formulated as the

buildings speaking to us in an unknown language. We recognise the sounds but grasp only fragments of the actual content. So how can we really understand these objects and the processes they have undergone? Yes, how can we, in the here and now, understand a dark past and is the truth to be found in the research literature, or in the buildings themselves?

We have two different ways of overcoming this distance. According to the theory of hermeneutics, we can either talk about "*the historical obscurity*" or "*the obscurity of the Thou*".⁴⁰ Conceptually these are two different ways of looking at the world. It is one thing if it is that dark past that is to be illuminated through contextualisation. Here we can add knowledge from a number of different sources which sets the object being studied into relief, or we can study the object on the basis of current concepts. This works well for the visually-oriented, art history and cultural history tradition. The dark you (or I), however, requires another approach entirely. It involves working in the here and now based on a different way of thinking; that I must change myself through a fundamental openness and humble submission by drawing the object to me; here; to me, here and now.

There are two different basic attitudes in the discussion on restoration craftsmanship. One says that those working with cultural heritage must protect the built heritage from the craftsmen's own choices and interventions. The other attitude contains a concept of continuity and tradition. Here the thinking is that continuity puts the craftsman in a special position to interpret and understand the craftsmanship of the past. There is an idea that the craftsman, who masters manual craft methods, is part of a long, continuous, tradition; a chain of agents which puts the craftsman into indirect contact with the craftsmen of the past.

In the wooden boatbuilding environment, there is currently a major debate on methodology, where traditional boat builders, cultural historians, archaeologists and those involved in reconstructing ships are arguing for and against this way of thinking.⁴¹ It concerns methodological considerations and the question is, at the deepest level, about the extent to which the historic fragments should be allowed to speak for themselves "as they are", or whether they should be heavily interpreted in order to be meaningful or true. The discussion thereby includes the question *who* is competent to interpret objects of the past. This debate can be raised to a higher level and

apply to all interpretation, whether it is the craftsman, the building researcher or the administrator's knowledge we have in mind. However, in order to get a handle on this we must first understand what a tradition is.

What is tradition?

Tradition is a fundamental way of transferring knowledge which is significant to us in two ways. Firstly, we can see how we learn from others. Secondly, through knowledge of the nature of the tradition we can investigate whether there is a real or actual continuity between then and now. In order for something to be a tradition, it is a requirement that the content is handed on through a process and that the content of the tradition gives rise to cultural continuity.⁴²

The definition emanates from the philosopher Bertil Rolf, who in turn develops Michael Polanyi's concept of knowledge.⁴³ This is based on the premise that language is not sufficient to describe the world or to pass on our actions. In order to ensure continuity of knowledge, practical interaction and shared assessments are required, and knowledge is passed on through the tradition. My concept of tradition is therefore defined conceptually and is given an analytical orientation.

Some factors can be derived as being significant in order for a tradition to be passed on.⁴⁴ Firstly there must be mutual, trusting, direct contact – and respect – between the tradition's generations. Furthermore, a fundamental openness through willingness, confidence and submission to professionals and principles is needed. If the situation is not built upon trust, and the master is deemed to be incompetent, you are not going to learn very much. Hence one has to submit oneself to the totality in order to be able to understand and see the individual elements. One must have trust in order to see and learn before one can recognise the full content of the tradition. The tradition may well have its heroes and we may want to try to adopt the heroes' perspectives and views. Hence criticism of the tradition comes later. If criticism comes earlier, the knowledge will not be acquired.

Independence will come sooner or later, but will result in continuity, rather than a breach, because it builds on the knowledge that one is trying to dismantle. Hence changes will occur gradually and three generations will potentially need to be unanimous about the changes

if there is to be continuity in the tradition. It must be stressed that we are not talking about generations in a biological sense, but in the tradition's own terms. Based on this way of thinking, we can investigate empirically whether there is a relationship between then and now.

Tradition acts as both content and in the form of a process where the actions associated with the objects and the understanding of what we need to do must be in continuous movement, as part of a long, unbroken chain. For the stave churches we have no fundamental connection at the level of craftsmanship from the time when they were built to the present day. Understanding and context must be reconstructed. How is this possible when we have no living role-models?

In my survey of the reports, I demonstrated that craftsmanship is used as a basis or a starting point for practical investigations. Craftsmanship can be used as a platform from which to ask questions. This takes us on to the philosophy of knowledge and phenomenology as a methodology.

Handing on practical knowledge

I do not regard knowledge as objectively true statements about the world. This type of positivistic knowledge view will never be able to provide the right answers because objectivity is an illusion. Every description and every statement will come from an individual, in a given situation, and will build on other knowledge. Knowledge is rather something that takes place in a subject that is faced with an object. My concept of knowledge is based to a large degree on Bertil Rolf's interpretation of Michael Polanyi's philosophy concerning the function of tacit knowing.⁴⁵ Here a distinction is made between the way in which knowledge is expressed and the function of knowledge. According to Rolf, knowledge is a tool. Here there is no given knowledge that is unachievable or impossible to describe. However, there will always be large areas where we do not have any tradition of reflecting or describing. Knowledge, however, has a tacit function: it acts in silence and enables the practitioner to direct his attention towards something and work on or describe the world. In this way the tacit function of knowledge can be compared with phenomenology's positive concept of pre-judging.⁴⁶

In a situation where we are doing something, the axis of time melts so that we reach into the future through

our intention, while at the same time we rest on our pre-judgments. Expectation and experience thus hang closely together. Experiences are created in relation to expectations, because we act based on intentions. “Experiences involve a tacit function which puts us in a position to understand or act on something to which has our attention”, we might say, if we want to bring together the thinking of Polyani and H.G. Gadamer. In this dynamic process, the future and the past merge in the actions of the present. We might say that time ceases to exist in the action. However, if we reflect, study, and justify, our view moves in different directions. Whether we look forward or back in time is very different, depending on the type of ideology, education and experiences we bring with us.

The hermeneutic experience deals with how representations of the past are made accessible to us through being handed on. Tradition becomes experience, according to Gadamer.⁴⁷ He declares this as the handing on being not only an event but also being a language and speaking to us as a *you*. Within the historian’s text paradigm, or in conversation, this provides meaning. The handing on is verbal and becomes our experience through reading or dialogue. For a stave church, we will have other methods for how the handing on is converted or mediated in the form of an action or a language. However, there is another condition that must also be satisfied. The hermeneutic experience indicates that I must recognise the differences of the past and that this has something to show me. I must adopt a fundamental openness which enables me to accept the otherness.

Openness to the other, then, involves recognizing that I myself must accept some things that are against me, even though no one else forces me to do so.⁴⁸

In order to understand something new (or something old), i.e. something that lies beyond one’s self, a fundamental submission to something one does not understand at the outset is required. This can be a difficult exercise that requires intense training if one is to abandon one’s pre-judgements or one’s own experience with a tool and look anew at the nature of the source. At the most fundamental level this requires asking a question.⁴⁹

In order to pose a real question, one has to want to know and one must be aware that one does not already know. The phenomenon is brought out into the open. Gadamer emphasises that in reality one can understand

a text, provided that one has understood the question that the text answers.⁵⁰ This can be transferred to other sources as well. The question is whether one has the qualifications to ask good questions based on one’s own pre-judgments and at the same time succeed in being open enough to understand that the answer does not lie in one’s own tradition but between the question and the source. The answer may thus challenge one’s own preconceptions.

Personal experience

In our own time, knowledge of pre-industrial craftsmanship is a field where we – in a phenomenological sense – have lost much of the tradition’s insight. We are more or less standing on bare ground. The field of knowledge’s form of expression is not really verbalised in the way it is portrayed today. The lack of a scientific basis is due to the fact that there are still very few research projects concerning the actual craft. This does not mean that the craftsman’s work necessarily takes place without reflection or analysis. Rather, the restoration work builds on experiences which allow room for reflection.

If we turn to Gadamer’s understanding of experience, he emphasises that this has its own internal historicity. That is to say that experience is self-referring; it is valid only as long as it is self-confirming. At the same time, it is the case that without experience we cannot draw conclusions. Experience is not science itself, but it is a necessary condition of it.⁵¹ My question is not whether experience is vital for building up knowledge or not. Instead the question can be reduced to whether our experiences can be used to create contact between the dark past and the dark *you*.

At a fundamental level we can ask questions about whether there is real continuity between past and present when this involves a source or an object. We can look at a text: *stavkirkeprekenen* (the so-called Stave Church Sermon from the 1100s) obviously possesses continuity as a text. It exists and we can read it, but does the text have the same meaning for you and me as it had for the author, for the scribes who copied the text, for the priests who officiated at services for their congregations? It is thus not *the text itself* that contains the interpretation or understanding. The understanding lies *alongside* the text, in the form of something that is a mix of inherited tradition and our own experience.

This phenomenological interpretation framework is called reception history.

Tradition's own methodology for transmission, lies, according to Polanyi, in the execution, application or use, while Gadamer identifies usage to be the fundamental problem of hermeneutics.⁵² There is not just an interplay between understanding and interpretation but a rotation between the elements of understanding, interpretation and use. An understanding of the Bible or a legal text takes place through use. The craftsman's use of an object is very different to that of the administrator and the researcher. Through its own use, each individual profession will develop its own starting point for understanding and interpretation. This can affect the object itself, but it can also be through the practical application of crafts, with corresponding materials, tools and methods that are included, and that test out the fundamental continuity of reception history. In the same way, it can be said that one must first understand the fundamentals of the language the text is written in for the text to become meaningful.

A craftsman who is on the inside and has mastered a tradition will thus be in a position to answer all the questions that relate to his own work and his own tradition. The answer can be expressed through actions or through words. But can the traditional craftsman answer questions about the past or questions that concern other traditions? My view is that it is perfectly obvious that he cannot, based on his *own* tradition. However, it is possible to use one's own tradition and craftsmanship to ask good questions about other traditions. These questions can at best be answered in a dialogue with different sources that are relevant for studies of the object we are faced with.

The traditional craftsman who works with restoration is situated between his experience and his work tasks. Being in contact with the source gives a unique closeness. When something is to be repaired, it is necessary to go behind the surface. This also involves building, restoring or repairing an object; an analysis of the situation. This means considering suitable measures and anticipating the consequences. This is not to say that the analysis is necessarily good. Nonetheless, an analytical section will be linked to such work.

The nature of the application can represent the core of the difference between the craftsman, the researcher and the administrator. This reflects both the way that

knowledge comes about and the actual interpretation situation. We can say that knowledge is practical in a double sense: it is both created and continued through action.⁵³ However, we can also add that it contains a social aspect. The nature of the practical actions is, however, very different within each of the three professions mentioned here as they have learnt and practice their work in different ways.

Some learning points

Research, craftsmanship and administration build on different perspectives, but the three fields have different qualities that can enrich each other. In order to achieve this, it is important to recognise each other's views, value sets and methods.

There is a great need to go ahead with major research projects linked to the crafts behind the stave churches. This can be done by using different methods. One possibility is to continue the administration-driven research that takes up themes as and when opportunities arise linked to decay in the stave churches. This potential has already been used up for the foreseeable future, as the churches are now all in a good state of repair. If research is to be carried out, it will be necessary to work only with the visible surfaces.

Another opportunity therefore is to look at the surviving material from repairs that have already been carried out, or the remains of the churches that have been demolished. Research into the wall plate from Nore stave church shows the potential that may lie in looking at moveable objects. The moveable objects and the extant cultural heritage object lead to a reciprocal increase in value through referring to each other.

A third opportunity is to use the sources more actively and look behind what is visible. This means that a decision must be made to dismantle elements or whole buildings in order to grasp the deep, underlying knowledge if necessary.

A final opportunity is to build a proper copy or a good reconstruction, where everything is done from scratch, with proper studies of tools and tool marks.

In the Stave Church Preservation Programme and the Medieval Project, craftsmen who work for the Directorate of Cultural Heritage have been given greater powers of definition. There is a general trend for building conservationists to spend more time on administration and



Section of the framework and roof construction in Haldalen stave church at Sverresborg. The framework forms a delicate and advanced technology with great strength and enough properties to counteract the side pressures on the walls. However, little has been done to study the construction in depth and to understand the underlying pattern and how the different construction elements work together. Between the rafters are three by three vertical roof boards. Outside is the original cladding, fastened with wooden nails. The characteristic shingles on the roof are old, but still a secondary roofing. The two layers of roof boards that intersect creates rigidity and stability in the roof construction. Photo: Terje Planke 2015.

less time in the field on each individual project. This results in less insight into everything that lies beneath the surface. The craftsman's knowledge, on the other hand, is based in the practical side of the projects. At the same time, more emphasis is being given to the analytical and verbal than before. In this way, craftsmen can contribute to creating good dialogue with the conservationists. Conservationist and craftsman will, in the best case, act symbiotically: they will be dependent on each other's knowledge and position.

However, it now appears that the balance of power is shifting, as it is now easier for the craftsman to adopt the conservationist's perspective than for the conservationist to grasp the craftsman's area of practice. In order for the administration fully to understand the craftsman's analyses and texts in a research context, a fundamental

practical insight is required, sufficient to encompass ordering competence and to be able to act in dialogue with the craftsmen. Knowledge makes it possible to provide good input into the dialogue and at the same time to prevent those managing the case from being dominated by the craftsmen.

The Stave Church Preservation Programme builds on the Medieval Project and has brought with it knowledge about craftsmanship. It has been important to involve the craftsman in the whole process, from documenting objects to writing condition analyses, formulating hypotheses, coming up with proposals for solutions and working on experiments. The Directorate of Cultural Heritage should be applauded for wanting to bring research aspects into an administrative programme. At the same time it is tempting to criticise the Directorate for



Section of the cladding in the ceiling of Haltdalen Stave Church. A wooden knee bracket binds together the rafter and the wall plate. Three by three vertical planks lie between the rafters. The ceiling has clear, marked traces of splash whittling. The axe marks are somewhat unusual as they run along the fibres. This cladding and the axe marks in the ceiling, are a good source for reconstructing the work behind the horizontal boards that lie above. Photo: Birger Lindstad 1999.

the way this was done. The Stave Church Preservation Programme could advantageously have been drawn up in a more open way. It could have contributed to greater knowledge development and a wider dissemination of knowledge. With simple steps, such as open dialogue, blogging and practical seminars, the project could have created a greater increase in knowledge across the whole field and not just amongst individuals.

Now that all the stave churches have been put into a good state of repair at the same time, it will be a long time until the next round of repairs. There is a danger that some of the most concrete, practical knowledge and the most specific experiences from the Stave Church Preservation Programme will be lost during this time. This does not look like long-term, sustainable knowledge management, but rather a political, all-out effort

mentality. By taking one church at a time, and taking longer, a greater increase in knowledge about medieval craftsmanship could have been achieved.

We have seen the great significance that the moveable construction elements have for increasing knowledge through the wall plate project described above. It is worrying that there is no administrative regime for dealing with construction elements taken out of listed buildings. These comprise a significant knowledge potential, especially when the construction elements are seen in the context of the extant buildings from which they come.

Further challenges

Through an analysis of various texts and a reflection on the concepts of tradition and knowledge, I have tried to say something about what research into craftsmanship could be and what it could be suitable for. The exercise of craftsmanship provides an insight through the embrace of the particular: an insight that is different to what is acquired through pure observation. The practice of immersing oneself in the material, where the craftsman works with fragments of the past, leads in turn to having to make choices. Herein lies a potential that can be cultivated and turned into a strength.

The study of the material discussed here shows that craftsmen deliver good, sensible but modest reports. The craftsman's view is based on his own experience, linked to analysing decay and making changes. It is important that the craftsman is brought in at an early stage and included right from the start, as a partner in the decision-making process. Through real dialogue, one can avoid conflicts of value and rather achieve valuable conflicts with major professional development. Here the different roles need to be developed, but all the participants must have an insight into craftsmanship in order for the discussion to be equal.

At the same time it is clear that the craftsmen could have been stronger in expressing themselves more clearly and delivering more quality-assured analyses

and reports. With a broader degree of knowledge the craftsman could raise the work to being *research* and not simply *exploration* of a field. Now it could be maintained that the reports are not meant to be research, but that they document a state or a process. This is correct to some extent, but nonetheless the reports form the basis for further research and publications and reference is made to them in stave church research. Thus it is important that there is a clear connection between the empirical knowledge and the claims made in the reports.

The field of craftsmanship research is new, small and different. One way to increase knowledge is for craftsmen to work together with scholars from different research fields. In the future we could have new craftsmanship researchers who are also production-oriented craftsmen. The craftsman's analytical skills build on experience of considering the consequences and are based on the experience-based knowledge about leaving one's own tool marks in the work. Another way is to cultivate the practice of craftsmanship and research into craftsmanship at polytechnics and universities, so that craftsmanship acquires its own academic methodology for history-oriented research.

Research into craftsmanship is well suited for proficient craftsmen who have had systematic training within the field, but the theme is also something we can all approach. It is particularly important that the questioning, the analytical and the experience all work together. If administration and research are to work together, the craftsmen in this field must feel safe to challenge the unknown and to cultivate uncertainty, but at the same time be able to strive for efficiency and credibility on the production side. It is therefore important to support the different courses offered by technical colleges and polytechnics which are today targeted towards the field of traditional craftsmanship, and at the same time safeguard the practices in the preservation projects.

In this way we can develop administrative craftsmen who are both analytical with regard to the object and able to reflect on their own position.

7. BETWEEN A TEMPLE AND A HOUSE OF CARDS

The stave churches and research¹

LEIF ANKER

A key issue in stave church research has been the question of their origin and development. Whether overtly expressed or not, the search for an answer has been a contributory motif, or premise, for both investigations and restorations of the buildings. This has been the case since the 1800s, when the stave churches became the objects of preservation concerns and investigations.

The narratives of their origins have sought in different ways to explain the churches' unique construction and decoration, and to place these in a wider historical context. Perceptions of the stave churches' origins and possible development have not only left traces in writings and education, they have left fundamental marks, as in the extensive restoration of Heddal stave church. Stave church research is therefore more than a theoretical activity: it directly impacts upon the way stave churches are treated and looked after.

Stave church research has been closely linked to two of Norway's central institutions of knowledge: the University of Oslo and the Directorate for Cultural Heritage. Lorentz Dietrichson, the great name in Norwegian stave church research, was at the forefront of this when he was awarded the newly-established professorship in art history in 1876.² Another force in stave church research around the beginning of the 20th century was the architect Herman Major Schirmer, who became the country's first Director General for Cultural Heritage in 1912.³ Today, well past the threshold of the 21st century, we are in the paradoxical situation where

stave church research lacks an institutional base for the first time since 1858, when the Storting's allocation in practice gave the Society for Preservation of Ancient Norwegian Monuments responsibility for registering and examining these churches along with other historic cultural monuments.⁴

The energy, breadth and scope of stave church research have gone in waves throughout the 19th and 20th centuries, sometimes across institutional and national boundaries, and mainly in the Nordic countries. The literature is overwhelming, including everything from short, popular pamphlets to major academic dissertations and books. Much has now been surpassed by new knowledge or been side-lined by alternative modes of understanding. Discussing this in full would be impossible within the framework of a concise research history overview. Many contributors who were important in their time, individual works and special studies have been omitted here. The main emphasis in the following is comprised of works which, in the author's opinion, have been formative for, or remain central to, stave church building history: i.e. what could also be called the research history of stave church architecture. An attempt is made to keep the account chronological, which will hopefully also provide an understanding of the longer trends in this history.

Portal carvings and their research history have been well-documented by the art historian Erla Hohler in her comprehensive two-volume work, *Norwegian Stave*

Church Sculpture, from 1999.⁵ The topics and the status of portal research have not changed much in the ensuing years. We recommend this book for a discussion of historiographic issues linked to these carvings. Some key questions for current portal research are discussed in a separate section at the end of this chapter.

Naturally, relevant questions regarding the current research situation do need to be considered. However, we need to emphasise that the primary objective here is to discuss characteristics of stave church architectural research history, not to present issues or formulate any specifically- defined programme for future stave church research. The latter is certainly a pressing issue but it falls outside the framework of this work.

Research is coloured by its time and the materials involved. Studies of Norwegian medieval relics, and stave churches in particular, are weak in sources beyond the objects themselves. Compared with, for example, England, Germany and France, the relevant written medieval sources in Norway are few, sparse and terse until we reach the 1300s. The written sources for post-Reformation times are somewhat richer, including church ledgers and reports from the 17th and 18th centuries, but are still inadequate. The sources increase in the 1800s, with travel descriptions, topographical literature and more richly-preserved archive material. Nonetheless, the primary material continues to be the relics themselves: in this case the stave churches and their traces and remains.

Regarding work on medieval stone architecture, sculpture and painting, to name the most important, there is a large amount of international material and literature available for comparison. However, the stave churches are now almost the last remaining vestiges of what was once an abundant diversity of wooden church architecture spreading from the Mediterranean to the Arctic Sea and the Davis Strait. The starting point for comparative studies of wooden church architecture must therefore be based on a very limited and historically randomly-preserved number of relics. The age of some of these relics is highly uncertain. This sways the researchers' approaches to problems and explanations and poses significant methodological challenges. Importantly, the source situation raises a fundamental question about the overall significance of stave church research: based on the surviving material, what validity can statements have about medieval wooden church

construction during the five hundred years between the Battle of Stiklestad in 1030 and the Reformation in 1537, limited geographically to today's Norway? The source situation has been seen as a fundamental problem ever since stave church research was in its infancy.

Historical research

The scope of stave church literature may seem to overshadow the fact that only a few of the stave churches have been thoroughly and scientifically studied and described. The stave church carvings, as mentioned, have been treated, discussed, catalogued and presented by Hohler (1999). Years will pass before any comparable overview will be available, even for the major stave churches. Urnes is currently the only stave church to be thoroughly described in two publications: H. Christie in 2009 and Knud J. Krogh in 2011.⁶ The other churches have been described to varying degrees, and some hardly at all.

A plan for research and the publication of a series of monographs for each of the stave churches was launched by the then Director General for Cultural Heritage Roar Hauglid in 1976.⁷ Three pamphlets in the series *Riksantikvarens skrifter* (*Directorate of Cultural Heritage publications*) were published, covering the stave churches in Kaupanger, Nes and Lomen. The last of these was issued in 1988.⁸ Given today's frameworks, it will take generations of research before the other stave churches are catalogued and described scientifically. We still lack an overview of what the material comprises, and new components from bygone stave churches continue to be discovered. We cannot even claim to have got our teeth into the subject of stave churches, and the topic is far from exhausted. In this light we must acknowledge that future stave church research houses a huge potential for radical amendments to "prevailing thinking" and established, or inveterate, perceptions about the churches.

Research history is treated in a number of contexts: as part of major presentations and in specific historiographical studies in articles and dissertations. This article owes much to these works. The architect and church researcher Håkon Christie, the art historian Wenche Qvale and the architect and church researcher Jørgen H. Jensenius have all raised questions about Dietrichson's stave church work, and more recent research.⁹ Hohler's overview of portal research could be called the broadest and most extensive work ever published in the field

of stave church research.¹⁰ It is a major starting point for anyone who wishing to understand the field, even though her presentation primarily focuses on portal research. The historian John McNicol made a broad, in-depth study of the whole discourse about cult-site continuity, pagan temples, “hov”, and stave churches.¹¹ In her dissertation, Wenche Qvale seeks to place Lorentz Dietrichson’s stave church book as a starting point for a research tradition.¹² The art historian and church researcher Hans-Emil Lidén provides valuable contributions to the early history of stave church research both in *Fra antikkvit til kulturminne (From antiquity to cultural heritage)* and in his biography of Nicolay Nicolaysen.¹³ These works are the starting point o readers who are interested in more detailed descriptions of these elements of the research history.

McNicol points out that the debate about cult-site continuity and its place in stave church research touches on several issues. He differentiates between cult-site continuity and cult-building continuity; in other words the question of continuity of location of a cult site on the one hand, and continuity in use of a cult building or construction methods in a cult building on the other.¹⁴ The question of continuity in use of buildings or continuity in construction methods has been a key issue in stave church research. In the following, the term cult-building continuity will be used in the context of re-use and/or continuity of construction techniques.

Looking back, *generally* one can distinguish between two main trends in stave church research. One involves carvings, primarily the carved portals, but also other building sculpture. The other involves building construction and the development of the architecture. This distinction is not absolute but the two fields differ methodologically, and over the years they have become increasingly specialised. What can be called church archaeology in this context can be designated as a later, third trend in stave church research on the basis of its methods and results, and its mounting importance in the post-war era. Up until the 1970s, church excavations in Norway were mainly carried out by architectural researchers who worked with stave churches, and so the excavations were linked to building documentation and the research project *Norges Kirker (Norway’s Churches)*. For reasons related to personnel and institutions, church archaeology in Norway did not become part of the growing field of medieval archaeology in the 1960s.¹⁵



Johan Christian Clausen Dahl (1788–1857) was born in Bergen in humble circumstances and rose to become a professor at the Dresden Academy of Art. Dahl was a central figure in Norwegian cultural life, despite living in Germany. He was a force behind the preservation of the stave churches and in establishing historic preservation in Norway, partly through his book on the Norwegian stave churches from 1837. Painted by Johan Vilhelm Gertner in 1844.

In the beginning were the artists

The beginnings of stave church research can, if a specific date were necessary, probably be ascribed to the year 1834. The painter Johan Flintoe described Heddal stave church in *Samlinger til det norske Folks Liv og Historie, (Collections of the Life and History of the Norwegian People)* illustrated with a sketch of the exterior and a floor plan.¹⁶ A few years later, in 1837, came the publishing of *Denkmale einer sehr ausgebildeten Holzbaukunst aus den frühesten Jahrhunderten in den inneren Landschaften Norwegens*.¹⁷ This rather elaborate title can be translated to modern English as “Monuments of highly-advanced wooden building art from the earliest centuries in Norway’s interior landscapes”. The author was an artist in his own right, and the first



Vang stave church in Valdres was demolished in 1841. It was bought by J.C. Dahl who in this way was responsible for the first stave church rescue-mission. His student, F.W. Schiertz conducted a survey of the church and directed the demolition process. Most of the building parts were transported over the mountains to Lærdal. From here, the journey went to Germany. Dahl had sold the church to the King of Prussia, Friedrich Wilhelm 4th. The church was reconstructed in what today is Karpacz in Poland, which at that time was a part of German Silesia.

The top illustration shows the chancel vault in Vang stave church, which arrived in Berlin but has since disappeared. Today we know it only from Schiertz' water-colours; here reproduced in Johan Meyer's copy from 1897. The décor is considered one of the foremost examples of medieval interior paintings in Norway.

The bottom illustration shows Vang stave church before it was demolished, as Schiertz viewed it from the south-east. The windows and porches were from a later date. The church's building history is little known. Inside, there were four free-standing posts. This solution has been central in the discussion regarding the presumed architectural development of the stave churches.

great international name in Norwegian art, Johan Christian Clausen Dahl (1788–1857), who at the time of publication was a professor at the Dresden Academy of Arts. Dahl's pupil, Franz Wilhelm Schiertz, did the illustrations. In retrospect it was a rather brief depiction, but it was an influential book, possibly even decisive, for starting preservation work early in Norway and for the relatively large number of stave churches that survive in this country.

Some 50 stave churches were still standing in Norway when the Society for Preservation of Ancient Norwegian Monuments' antiquarian Nicolay Nicolaysen, with funding from the Storting (the national assembly), established the basis for a systematic investigation of these churches in the 1850s. Thirty years later the number of stave churches had almost halved, to 27.¹⁸ These, along with remains of stave churches which are no longer with us, are and have been the prime material for such research ever since the days of Flintoe and J.C. Dahl.

Many stave churches were rudimentarily measured before they were torn down. Tenacious architects such as G.A. Bull and Chr. Christie rushed around the country on assignment from the Society for Preservation of Ancient Norwegian Monuments and noted the main characteristics in the construction and the size of an array of stave churches and other medieval buildings. Many were torn down soon afterwards. Neatly-drawn building surveys were published in pamphlet form with Nicolaysen's texts in *Mindesmerker af Middelalderens kunst i Norge (Memorials of medieval art in Norway)* (1853–1855) and *Norske Bygninger fra Fortiden I–III (Norwegian Buildings from the Past)* (1860–1880). As Lidén points out, Bull's drawings were almost revolutionary ways of presenting buildings.¹⁹ For the first time in Norway, medieval monuments were presented in three aspects: façade, cross-section and floor plan.²⁰ These collecting and publishing initiatives were part of a greater, widespread effort to accumulate and publish works on cultural history material from the Middle Ages and later, including medieval documents, folklore and folk music.

Nicolaysen interlaces his reflections on comparative analyses, and as early as 1855 maintains that the stave church with an elevated nave had its prototype in the European basilica built of stone.²¹ Nicolaysen's method was a comparative analysis of the individual elements of the stave church – pentice, roofing, etc., and between

stave churches and other buildings in wood, both in Norway and abroad. Nicolaysen had studied law. He tried to build fact upon fact, in a level-headed way. For his time, he exhibited a relatively critical approach to sources. He presented the material and gave his views on the major trends of historical development. The methodological challenges were only implicitly cited. He made no attempts at a unified historical overview of carving styles; woodcarvings are presented in a number of individual descriptions of each church. His primary concern is the historical development of stave churches and stave church types.

The first synthesis

The closest Nicolaysen comes to an overview of stave church history is an article in *Historisk Tidsskrift* in 1888 “Om hov og stavkirker” (“On temples and stave churches”).²² Here he summarises his view of the origin of stave churches and their place in European wooden architecture with a reference to his own and others' works. The starting point is a debate with Lorentz Dietrichson about the Norse *hovs*, or pagan temples. Nicolaysen reckons they were log-built in the same way as domestic dwellings were. He traces such medieval notched log buildings back to the Viking Age. Nicolaysen rejects any form of constructional or architectural continuity transitioning the religious conversion from the Norse *Forn Sed* or *Ásatrú* to Christianity. This is a much-discussed issue which characterised stave church research well into the 1960s, and still emerges today from time to time.²³

According to Nicolaysen, the building technique of the churches came with missionaries. He refers to the known historical sources about wooden churches abroad, and compares known surviving buildings which he had seen himself, with the stave churches. Of central importance here is the wooden church of St. Andrews in Greensted, Essex, where the nave has a stave-like construction with upright, split oak logs.²⁴ Based on the historian P.A. Munch's estimate of “about 920 rural churches” at the time of the Reformation “in what is present-day Norway”, he calculates that there were about 500 of unknown construction.²⁵ Based on a detailed survey of written sources and a discussion of them, he thinks he can “[...] conclude that all the country's wooden churches built prior to the Reformation were stave buildings, with the exception of a negligible



Heddal stave church, facade to the south, plan and interior to the east. Lithographs published in Dahl's book after drawings by Dahl's pupil Franz Wilhelm Schiertz (1813–1887). The description and illustrations in Dahl's book contain significant documentation of the church before the comprehensive restoration between 1848–50.

number of churches which were built using the log construction technique in the late Middle Ages”.

His reasoning has generally stood the test of time in research. Nicolaysen goes a step further, however, in asserting that the number should be raised: “Because very few of the rural churches still standing in our century can be dated further back than to ca. 1150 [...] the preceding buildings probably had older predecessors, built shortly after Christianity was introduced”. Exceptions would be only be found in remote areas and mountain villages. He assumed that these lost wooden churches had vanished for good. Discoveries of so-called “earth-fast” wooden churches would be made in the future. The founder of Norwegian archaeology did not think about church archaeology and its potential. Nicolaysen states that the vanished stave churches were not necessarily as “equally robust and meticulously equipped” as the ones

that had survived. He did not pursue this idea further or question whether the surviving stave churches were truly representative of construction methods and dating. His main concern was to emphasise that the wooden churches were made with staves; then point out common characteristics, and thereafter investigate where the individual traits had their origins. In short, what is domestic and what has come from abroad? The stave churches’ common characteristics are the construction, the pentice, the open roof rafters without a ceiling and the floor plan.²⁶ Nicolaysen thinks the pentices could have been borrowed from Norwegian domestic dwellings. The corbel or truss came with Christianity from the west, but Nicolaysen adds that it “could possibly developed within the country itself”.²⁷

In Nicolaysen’s view, the stave churches in their simplest form came to the country with the Christian

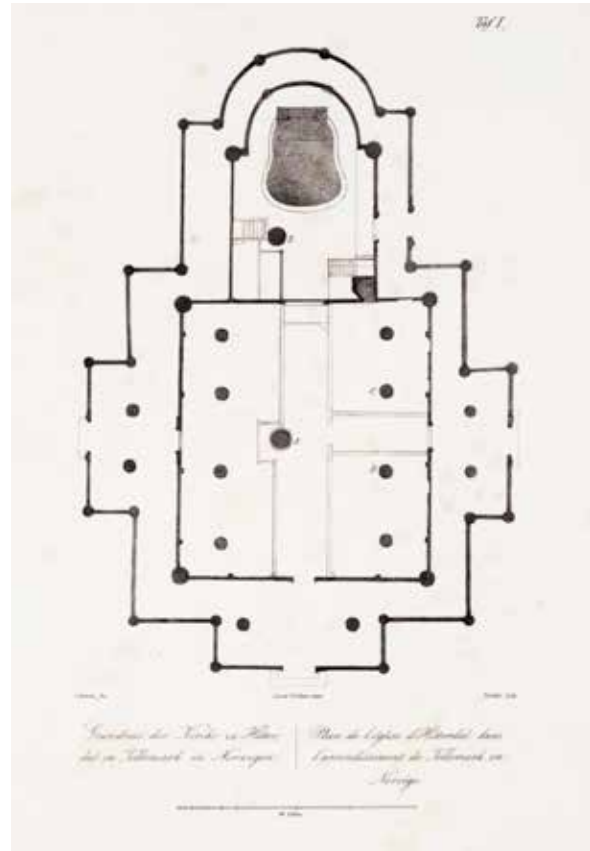
missionaries from the British Isles, but they had domestic features. The floor plan of the church is very simple in the beginning, as in older Irish churches: “one started with the simpler forms and gradually went on to more intricate ones”.²⁸ Here he discusses what he presumes are the first basilica structures in Norway and dates them as older than the stave churches with an elevated interior post nave and chancel.

[...] with these [...] another question arises which it would be interesting to have answered, although it is unlikely to be confirmed with certainty. This is whether the stave buildings with this form or interior construction had precursors in England and therefore were directly imported, or whether they can be considered as a Norwegian adaptation of stone basilica designs in stave construction, given the mandatory adjustments this would entail. *As long as it remains unknown whether there were such buildings in England or Ireland, this question will remain unanswered.* (author’s italics.)²⁹

Here, Nicolaysen has touched on a key question that has concerned many researchers, namely the origin of the stave churches with elevated central spaces and interior posts. The issue has been fundamental and formative for stave church research up to the present. Nicolaysen’s caution about sources, and the crux of the matter – the chance of finding an answer – have often been side-lined by the urge to draw the bigger picture.

Dietrichson’s stave churches

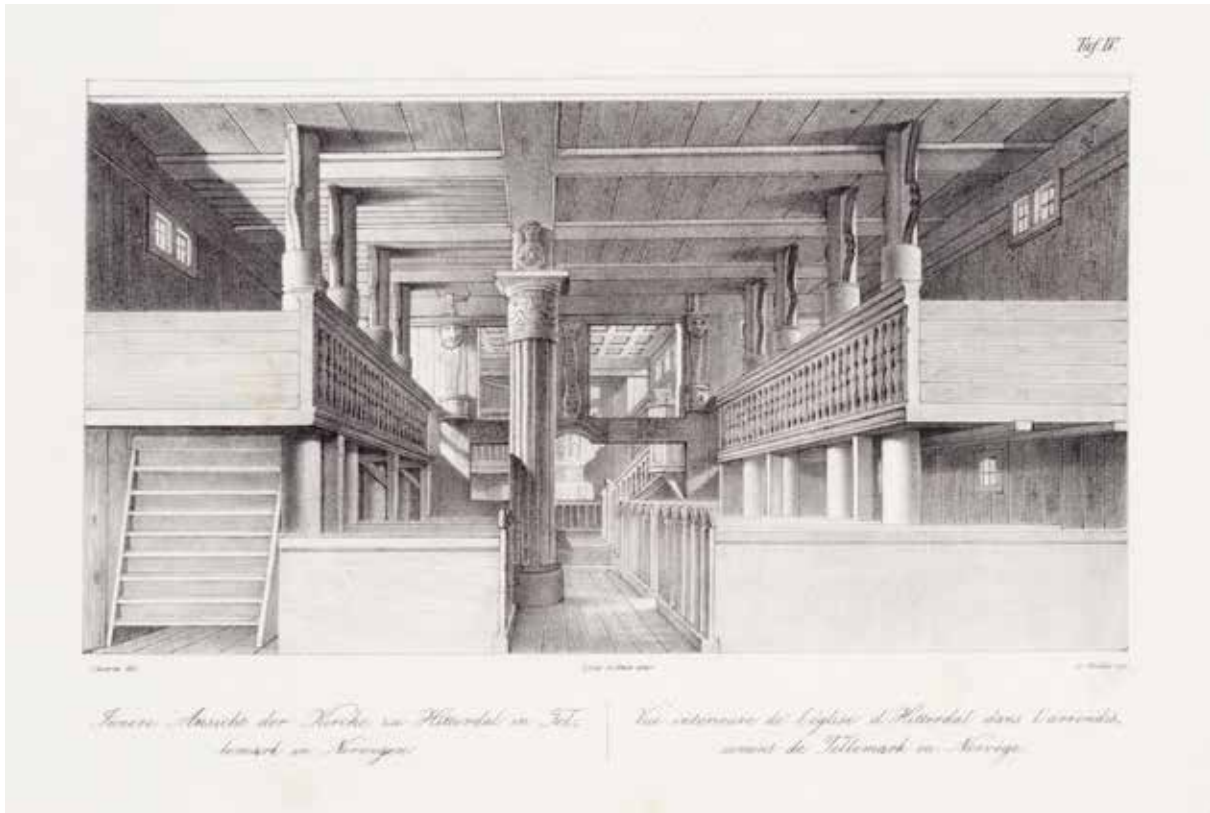
In the research history, the idea of churches with an elevated central space and interior posts inspired by basilica structures has mostly been attributed to Lorentz Dietrichson, the first professor of art history in Norway. His book *De norske stavkirker. Studier over deres system, udbredelse og udvikling* (*The Norwegian stave churches. Studies of their systems, distribution and development*) published in 1892, has held research in a tight grasp. Its basis was Dietrichson’s earlier works, and all the extensive material Nicolaysen and the Society for Preservation of Ancient Norwegian Monuments had collected and published.³⁰ Dietrichson could also draw on printed source material, church ledgers and in particular his comprehensive knowledge of historical architectural monuments and art history literature abroad. His book



Heddal stave church, floor plan in the 1830's. Illustration from J.C. Dahl's book on Norwegian stave churches.

and activities have not only set their mark on stave church research, but they have also given rise to numbers of works in this historical field.

Dietrichson set himself the task of presenting all the known material and synthesising it. Like Nicolaysen he was clear that the sources posed challenges. He says in his introduction that presenting a consolidated historical presentation would be like “a leap into the dark”.³¹ Where Nicolaysen let it be, Dietrichson indeed jumped. In the book, he presents an almost complete catalogue of all the stave churches in Norway known at that time, as well as construction elements, portals and written sources about the individual church. He only missed the tiny stave church in Undredal in Sogn, as it was not generally recognised as a stave church until nearly ten years afterwards.³² Oddly enough, Dietrichson is the only one before or since to think that the reason for the stylistic differences in Urnes’ wood carvings was due to



Heddal stave church, interior view. Illustration from J.C. Dahl's book on Norwegian stave churches. Lithography of a drawing by Franz Wilhelm Schiertz. This is the only depiction of the interior which was lost during the restoration in 1848–1851.

two contemporary master craftsmen, rather than two construction phases.³³ He places this material in conjunction with an account of medieval wooden churches in Europe.

Dietrichson arranges the carvings chronologically according to what he calls external and internal criteria. The external are dated and undated written sources, dated archaeological finds such as coins, etc. The internal relate to the objects themselves: portal motifs, the execution and placement of motifs and style characteristics in the decoration. Dietrichson groups the portals and the carvings according to the motifs and styles, and places them in chronological categories with a three-phase development: the archaic period (the Urnes style), the “flowering period” and the period of Gothic decline. He places the portal art and the wood carving in a European context and emphasises their preconditions in contemporary church art on the Continent and in domestic traditions.

This perspective is linked to the relationship between external impulses and the independent creative element on Norwegian soil.

Dietrichson uses the same method with regard to building analyses, but here the picture is, if possible, even less clear as no comparable European material exists. Instead, he sets criteria for dating on the basis of building typology. This typology is defined as the floor plan, technical construction methods and the design of the stave configuration. Assumptions are unavoidable when setting typology as a criterion for dating the buildings. Tautologically, what is being proved is already built into the premise.³⁴

As Nicolaysen had done a few years previously, Dietrichson analyses what he sees as common elements of the stave churches, such as pentices, a frame construction and roofing, in order to see what had a domestic origin and what came from abroad. However, he arrives at a different conclusion: the stave churches originated



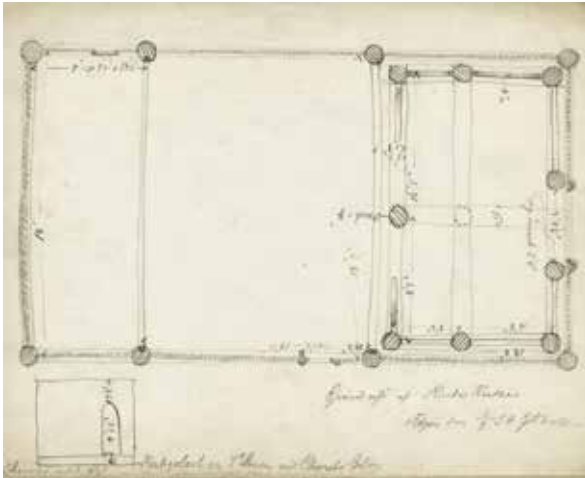
Heddal stave church seen from the East, as the artist Thomas Fearnley (1802–1842) drew it in 1822. Photo: The National Museum of Art, Architecture and Design (Norway).

and developed in Norway, based on cult buildings from pre-Christian times. These in turn were inspired and built on the pattern of wooden churches in the British Isles, brought back by Vikings sailing home from raids to the west. The impulse is the same as the one Nicolaysen thought he could trace, but goes further back in time. As a result, the national aspect of the stave churches becomes more prominent: the stave construction had been further developed on home ground by the time Christianity arrived. Norse temples could be put to use as Christian churches in a transitional phase, next to what Dietrichson calls “emergency churches”, the first churches in the Christian era. The building of stave churches does not represent a break, but rather a continuation of cult building construction.

The surviving stave churches only show the development where the oldest surviving churches are the ones that replaced the “emergency churches”, although better built and more richly adorned. Types and variations are

phases of a long domestic development and an eventual flowering of wooden architecture and wood carving. The large stave churches, with naves and chancels supported by free-standing staves, are therefore the apex of a development of wooden architecture on Norwegian soil: “A brilliant interpretation of a basilica in wood,” as Dietrichson rephrased Nicolaysen’s view of the churches with interior posts.³⁵ The stave churches were an independent, outstanding Norwegian contribution to European cultural history.³⁶

Strongly influenced by evolutionary views, Dietrichson sees variations in building constructions and building types as parallels to the development of styles. Constructions and structural elements are not evaluated on the basis of the size of the buildings, nor the relationship between heights, lengths and widths in the various parts of the construction, neither on local climatic conditions such as the loads caused by wind and snow.³⁷ String beams and cross braces (“St. Andrew’s

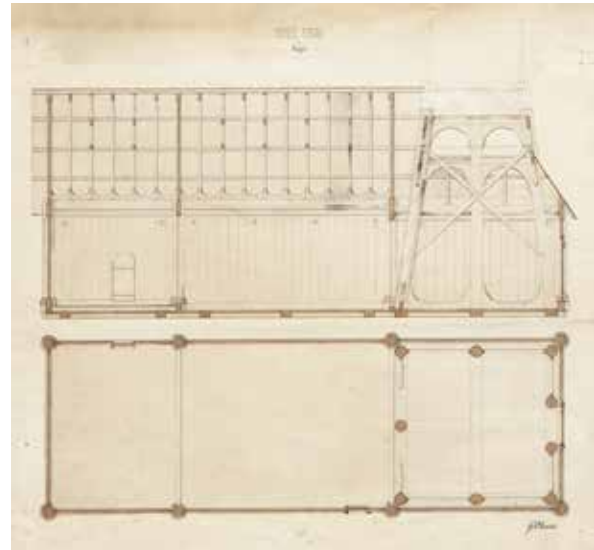


A page from G.A. Bull's sketchbook dated 2 September 1854 showing the floor plan and elevation of the north wall of the nave of the stave church at Rinde in Feios, Sogn.

crosses”) are regarded as differences in style and a development toward what can seem like a predetermined goal, “the fully-developed stave church”. From there things can only go one way, into decline. The centre post churches represent the arrival of Gothic architecture with their struggle for height, and thereafter the buildings and forms become “simpler”, while portal art degenerates. Dietrichson’s approach divides; the carving is seen in a diffusional perspective, whereas the architecture is seen in an evolutionary perspective. The wood carving indicates a European influence, while foreign influences, with basilica churches, only impact indirectly on the introduction of interior post churches; the building development is “Norwegian”.

Dietrichson’s explanations

In the conflict between fragmentary, surviving material and the urge to order and systemise it, Dietrichson offers an explanation within a contemporary national horizon of understanding. He creates an image of an art and architectural development which has impacted on later understanding of the stave churches.³⁸ He explained the stave churches’ solitary existence in Norway on the basis of the material known at the time. As McNicol and Jensenius point out, this explanation served a function and filled a vacuum, based on contemporary source material and research conditions.³⁹ Dietrichson’s capacity



From G.A. Bull's sketchbook dated 2 September 1854. A finished drawing with plan and elevation. The finished drawing deviates from the sketch on some points.

for making convincing arguments and his systematic presentation of the material have overshadowed the starting point in Nicolaysen’s terse, concise sketches of the development of the stave churches.

Like Nicolaysen, Dietrichson stresses that sources are fragmental. He discusses the methodological challenges this implies and makes broad reservations. At the same time, his portrayal and arguments create a picture and a map devoid of any troublesome blank spots. These reservations are emphasised in the general discussions while they are largely absent in the concrete arguments. Adjectives flow freely. Dietrichson’s viewpoints and frame of understanding are grandiloquently national:

[...] should these buildings, rising bravely out of mountainous nature, contain nothing created by the people themselves in harmony with the climate and the national customs they were to serve?⁴⁰

It was the people, the nation, which built and mastered the materials, the wood, in ways no one else could. Viking ships, stave churches and wood carvings were viewed as a national characteristic, where the woodcarving tradition was a particular talent of the Norwegian peasant, an interpretation with roots far back in time.⁴¹

This view of the stave churches and wood as the people's, or preferably the nation's, material in the art of building, is deeply engraved in perceptions of the stave churches and medieval Norwegian wooden architecture to the present day, including specialist circles.

The view of the perceived pre-Christian cult buildings – the “hovs” – as the starting point for the stave churches was criticised for its flimsy basis in sources by Nicolaysen, but eventually struck a chord with both laymen and scholars alike.⁴² Dietrichson's method and his categorisation of the portals and carvings have largely been retained by later researchers, with fruitful results.⁴³ The views have been refined and developed with substantial modifications, but they are built on his foundation. His analysis of architecture and his typological development scheme were quickly adopted and have become part of the canon of stave church research without attracting much criticism.⁴⁴ The methodological uncertainty of attaching typology to an historic development on the basis of a handful of buildings was not seriously challenged until the 1970s.⁴⁵

From hypothesis to dogma

Numerous building studies of stave churches were published in the years following the publication of Dietrichson's stave church book, partly in dialogue and partly in discussion with his work.⁴⁶ At Urnes, for instance, actual construction conditions were described and pieced together to create a building history based on a closer examination of structural details and craftsmanship. This was also associated with the repairs and restoration work there.⁴⁷ Such investigations did not undermine the solid impact of Dietrichson's basic scheme. The architect Herman Major Schirmer, who succeeded Nicolaysen as the antiquarian of the Society for Preservation of Ancient Norwegian Monuments in 1899, saw, as Dietrichson did, an unbroken stave building tradition going back to heathen times. However, he thought the origins lay in a domestic building tradition, rather than one picked up abroad during the Viking voyages.⁴⁸ Schirmer argues strongly that the reused parts of the stave church at Urnes came from a *hov*, and he has a similar view of the other known building parts with Urnes-style carvings.⁴⁹ He sees these as remnants of the last phase of heathendom, with the curling animal carvings and beasts with gaping mouths on the gables setting an indelible



Nicolay Nicolaysen (1817–1911) was chairman and the driving force in the Society for the Preservation of Ancient Norwegian Monuments from 1851. From 1860 he was also the society's antiquary with a state salary. Nicolaysen organised the society's surveying and registration work of medieval buildings and prehistoric cultural monuments, as well as comprehensive excavation work, including the Gokstad ship. He is regarded as the founder of Norwegian archaeology. Photo: unknown, undated.

mark on the later portal art and decoration of the stave churches.⁵⁰

Few art historians who have worked with the period subsequently have followed Schirmer here, but the notion has permeated literature, where it lives on.⁵¹ Schirmer used Dietrichson's typology and elaborated on it, partly based on based on the architect J.Z.M. Kielland's analyses of Urnes, Hopperstad, Borgund, Lomen and Høre.⁵² He portrays this evolution schematically with sketches of the central space interior post construction in an even, gently- rising line from Urnes via Hopperstad and Borgund to Høre. The only “missing link” is represented by some not insignificant quadrant brackets in Hopperstad's interior post construction, which are omitted.⁵³ He does not explain why the longitudinal walls' supporting members were chosen



Lorentz Dietrichson (1834-1917) came, like Nicolaysen and Dahl, from Bergen. In 1875 Dietrichson became the first professor of art history in Scandinavia. He produced a large number of publications. His book on the stave churches (1892) has both directly and indirectly shaped subsequent views of stave churches. Photo: Anders Beer Wilse, ca 1910.

and not those of the short walls. This would have given a different result.

This postulate helped to cement Dietrichson's typology for the years ahead. His perceptions and views about the stave churches' development were adopted, although not without reservations and source criticism from Schirmer. Paradoxically while knowledge of monuments was expanding, no Norwegian discussion developed involving source criticism and ways of carrying out research on buildings. This discussion came from Sweden.

Swedish stave churches emerge from oblivion

In the autumn of 1896, materials from a torn-down stave church on the island of Gotland in Sweden turned

up. The floor in Hemse Church, a medieval church built of stone, was to be replaced, and the old one turned out to consist of wall planks, beams and wall plates from an older stave church. The discovery was astonishing, and moreover, was so extensive that large parts of the stave church could be reconstructed.

In the years that followed, stave church materials continued to turn up in a number of churches. Older findings of construction elements were reinterpreted in the light of the newer ones. Shortly it became clear that stave churches had also been built extensively in Sweden during the Middle Ages. A new discovery, essential to stave church research, was made in Lund in 1911. During the excavation of the foundation of a stone church the remains of an older wooden one were unearthed, Sancta Maria Minor, which was dated to the mid-1000s. Lund was at that time Danish, and one

of the most important cities in the Nordic countries. Instead of fitting into wall sill beams, the wall planks were anchored in a ditch in the ground. The planks had large split logs in oak with narrow loose tongues between them, like the church at Greensted, Essex. This changed the understanding of the Greensted church's original construction (the existing foundation in brick is from the 1840s) as similar to Sancta Maria Minor, which had split logs dug into the ground. All at once, a new, decisive stage in the history of stave church evolution had emerged: earthfast constructions which were older than the known stave churches with sill frames on dry wall foundations.

These Swedish findings were published by Emil Ekhoﬀ in 1914–16.⁵⁴ He goes through the Norwegian stave churches and the associated literature as a background before presenting the Swedish material: one surviving church, Hedared in Västergötland, a varying number of remnants from 11 churches and written information about ten or eleven others.⁵⁵ He sorts the material into typological groups and then dates these groups, but with a clear reservation, saying that older and younger types do not necessarily mean their construction dates to a specific time. The stave church remnants come from Värmland in the north to Skåne in the south, and from Gotland in the east to Västergötland in the west. Ekhoﬀ thinks the stave church construction in Sweden must have been far more extensive than indicated by the known material alone. He conceives of a similar path of development in Sweden as Dietrichson saw in Norway, with an established stave construction tradition prior to Christianity, whereas the building form with a nave and chancel came with Christian missionaries. Ekhoﬀ, on the other hand, thinks what he calls wooden-nave stave churches, i.e. with free-standing interior staves, are not a stage in an organic development. Rather, they have come directly from stone churches. In other words, they are of foreign influence. This cannot be followed directly in detail in the development of stave churches, because with the exception of the Greensted church, there is no foreign (non-Scandinavian) basis for comparison. Here he concurs with Nicolaysen nearly 30 years earlier. So it is impossible to decide what is native and what can be attributed to foreign influences.

Ekhoﬀ does not believe in any form of “emergency church” construction. He thinks a church like Sancta Maria Minor in Lund, built in one of Scandinavia's

most important cities, would have been constructed in keeping with the best methods of the time. He dates the stave church from Hemse with its sill frame, and the portal from Guldrupe on Gotland, to the 11th century, and thinks both of these Gotland churches must have been the first to be erected at their respective sites.⁵⁶ Therefore they indicate a well-developed church type not long after the palisade church in Lund. Contrary to their Norwegian counterparts, these wooden churches from the late Middle Ages in Sweden were built with the notched log method. Ekhoﬀ thinks the difference in Norwegian and Swedish stave churches can be attributed to the Norwegians' advanced wood construction tradition.

The discovery in Lund of walls sunk into the ground with interior, free-standing posts fits in well with established thinking about the evolution of stave church construction. This altered basically the perspectives about early wooden church construction. Norway was no longer necessarily the country where stave church construction began. The development could now be followed in stages with what were at the time reasonably reliable datings of archaeological discoveries.

Ekhoﬀ's source-critical approach in the discourse did not gain great acceptance. Much of the debate and research in the interwar years was less about the material, and what could reasonably be verified, but rather about what led up to the Christian churches: the heathen temples or *høvs*. What could be said about the existing stave churches had been said: now what counted was their origin. The discussion moved from Norwegian conditions to Swedish ones, more specifically to the Swedish archaeologist Sune Lindqvist's discovery of postholes in Uppsala and his interpretation of Adam of Bremen's story about the temple there. This was said to be a tall stave building and thus it could have been the starting point for the development of stave churches with interior posts and detached staves.⁵⁷ Lindqvist thought the churches with interior posts gave “a strong impression of the longhouse being a building of its own (...) that can only be explained through the prehistory of the building type”. He concludes that the first churches were built on principles that were centuries old.⁵⁸

This perception involves a *de facto* departure from the evolutionary teaching about the simple stave churches as the successors to heathen temples. Instead, the cult



Herman Major Schirmer (1845–1913) surrounded by male and female students from the Christiania kongelige Tegne- og Kunstskole (Christiania Royal Art School) surveying Rollag stave church in Numedal, 1911. Photo: Thoralf Christian Hauff.

building continuity was linked to the churches with an elevated central space in nave and chancel carried by interior posts. Therefore the apex of medieval wooden church architecture, the churches with interior posts, had purely Norwegian, or at most Scandinavian, preconditions without ideas from abroad. The Christian basilica was only *imitated* with decorative shallow forms.⁵⁹ The heart of the sometimes heated debate was whether the basilica had any role whatsoever in the development of stave church architecture. This is stated most emphatically by the architect Birger Ree.⁶⁰ Behind it all lay different views of architecture in general. These opinions about architecture can be followed far into the post-war period. Both can be called typologically development-oriented, the one in style analysis in keeping with Dietrichson, whereas the starting point for the other is building construction analysis.

Johan Meyer's chapter on medieval architecture in *Norges kunsthistorie (The history of art in Norway)* (1925) devotes much attention to the stave churches.⁶¹ There is not a great deal about the stave church carvings, but here he clearly disagrees with Schirmer's view of paganism in the stave churches.⁶² The main emphasis is on the stave church's development with building forms and types. Meyer does not comment on the views of Schirmer, Ekhoff or Lindqvist, but follows Dietrichson's established development theory from the *hov* as the Viking copy of stave-built Irish churches. Sancta Maria Minor and Hemse are mentioned, but as no corner staves have been shown to have existed in these, Meyer omits them in the subsequent discussion. For Meyer, the Swedish material is obviously irrelevant for the understanding of the *Norwegian* stave churches' development. Nevertheless, he clings to Lindqvist's perception of the

interior post nave as an older, pre-Christian building type. Meyer makes a link back to pre-Christian times by overturning the established view of the interior post churches' typological development. He does this by basing his view on what he calls "the craftsman principle".⁶³ Now, according to Meyer, the development runs from churches with string beams and diagonal cross braces, like Borgund, to churches without them, like Urnes. He views the latter as a bold and beautiful simplification of "the older system's engineering work".⁶⁴ No reason for this is given based on concrete, observable conditions in the individual churches. It was, as with Dietrichson, Schirmer and Kielland, *the system*, or more precisely, different forms of bracing of the nave's longitudinal walls that formed the basis of the idea, but now in the opposite order. As Hohler points out: stylistic datings were influenced and organised according to the view of the typological development.⁶⁵

Air beneath the wings of the hypotheses

This was an era where mirages could trump palpable evidence in the search for the origin of the stave churches. This might sound paradoxical. Knowledge and recognition of the individual monuments superseded what had been known when Dietrichson's stave church work was published. Emil Ekhoﬀ's *Svenska stavkyrkor (Swedish stave churches)* (1914–1916) had opened up new perspectives, and international literature on art and architecture history was richer, better-illustrated and more accessible.⁶⁶ Despite all this, Rolf Mowinckel's reconstruction proposal of the earlier church at Urnes became just an attempt.⁶⁷ Without measuring, surveying and documenting the construction elements, the proposal remained just a hypothesis. It led to no further examinations of the existing stave churches and neither did it bring about any decisive new orientation in the view of them as research objects. Building investigations were subordinated and had little influence on the syntheses. The focus was on the systems.

Meyer's hypothesis about the reversed development trend got little if any acceptance among Norwegian researchers. However, it was picked up by the Swedish art historian Gerda Boëthius and played a key role in her view of the interior post churches' precursors in heathen temples, like the one in Uppsala.⁶⁸ Here she combines the views of Meyer and Lindqvist. Like Lind-

qvist, Boëthius sees a line stretching from a tall temple supported by posts, via the post-supported Sancta Maria Minor in Lund, to what she defines as the *typologically* oldest Norwegian churches with interior posts. Examples are Høre (Hurum in older literature) and Lomen, i.e., churches where only the nave and chancel corner staves stand on the raft beams.⁶⁹ To include the individual stave churches in this classification, they are redefined as a "simplified" type.⁷⁰ For Boëthius the Swedish stave churches, with their interior staves anchored in the ground, are the "vital link" between the architecture of the Iron Age and medieval Norwegian architecture.⁷¹ For Boëthius too, the centre post churches were the Gothic entry into stave church construction.

Typology per definition also points toward a historic course in Boëthius' view. The datings are only partly relevant because younger style traits such as at Høre lay on the outside of a typological archaic solution.⁷² This is a similar method to that of Dietrichson, but in another wrapping and a different evolutionary order. Boëthius replaces the national orientation of Dietrichson, and later of Schirmer, with the "peasantry": what could be called a Nordic socio-ethnic explanation. The stave churches and the wooden constructions are "peasant art" – arts and crafts – in a deep-rooted tradition of craftsmanship. Here the Norwegian traditions are seen to have greater power than the Swedish traditions, where the development of wooden architecture was waylaid by the Church's European stone buildings. The Norwegian stave church was "soaked in tradition and rural style, yet simultaneously sensitive aware of the value of aesthetics in new stylistic changes".⁷³

Nordic culture

It might be symptomatic that the book *Nordisk kultur. Kirkebygninger og deres utstyr (Nordic culture. Church buildings and their inventory)* (1934) does not discuss the Swedish material. Boëthius, who wrote the Swedish chapter, mentions the Uppsala temple, but sidesteps the opportunity to say anything at all about the Swedish stave churches, and the Swedish log churches are not mentioned as a building type at all. Stone churches are the norm.⁷⁴ Anders Bugge's Norwegian contribution largely follows in the wake of Dietrichson. Bugge does not reject cult site continuity, but rejects cult building continuity, both in usage and in means of construc-

tion.⁷⁵ Here there is no echo of Meyer's alternative evolutionary path of the interior post construction. Bugge follows the time-honoured perception about the evolutionary path to the "stave basilica". Stone architecture is primary, and the impetus. He offers a new interpretation, or perhaps rather a new elaboration, on the importance of the stave church portals. He views the Urnes portal's four-legged animal, which is being bitten by a two-legged creature, as a repetition of the motif on the Jelling stones in Denmark: One of the image sides depicts a lion's struggle with a serpent. Bugge interprets this as good battling evil.⁷⁶ The same struggle between animals is portrayed in the 12th and 13th century dragon portals, but no longer as good versus evil. These are the satanic powers in *drageham* rising from Hell and engaging in a cataclysmic battle, Ragnarok, in confrontation with the Church. Bugge's picture interpretation raised an issue which had only briefly been mentioned in earlier research: to modern viewers, the stave churches' dragon portals do not seem to have any obvious Christian symbolism. Bugge elaborated on his views and gave reasons for them in later works without any major change of view.⁷⁷

The art historian Roar Hauglid's dissertation on the stave church portals in Setesdal was published before World War II, as the first monograph on stave church woodcarving since Dietrichson's days.⁷⁸

Architect Kristian Bjercknes's building history study and survey of Fantoft Church heralded a more thorough building analysis based on studies and documentation of the object, for the first time Kielland's and Blix's works before and after the turn of the century.⁷⁹ Bjercknes also expressed an opinion about the origin and development of stave church architecture.⁸⁰ Shingle siding, pentices, ridge crests and apses in churches such as Borgund, Hopperstad and Urnes are not original parts of these churches, but are later additions. He views these as links to "the Gothic period's lively forms" in contrast with the "sober" and "matter-of-fact" Romanesque with "consistency" in the demand for "constructionally-correct form".⁸¹ Bjercknes, like Boëthius and others, sees the churches with interior posts as a further development of an already existing pre-Christian building construction.⁸² He maintains that the main elements of the building construction are the same in all the naves of the interior post churches. He thinks this shared element of construction has undergone a long earlier

development prior to the surviving stave churches. He attempts to substantiate this opinion in a discussion of the churches' diverse decoration and decorative forms. Bjercknes criticises Dietrichson's style analysis of the building construction, but accepts the typology as a criteria of the development of churches with interior posts. This approach in a building analysis, strongly marked by a functionalist stance, would be followed up by both Bjercknes and Håkon Christie in the post-war years.

The final pre-war years and the years of German occupation saw a greater specialisation in stave church research: the study of the portals and the woodcarving – building sculpture – on the one hand, and building history and technical studies on the other, both solidly rooted in established points of view.

The German occupying powers also took an interest in the stave churches. In 1943, the Reich Commissariat of Norway published a popular, partly research-based and richly-illustrated (for its time) presentation of the stave churches, intended for Germans stationed in Norway.⁸³ For obvious reasons, it had no impact in Norwegian professional circles, neither when it was issued nor afterwards. On behalf of Heinrich Himmler's SS, Ahnenerbe, the German architectural historian Hermann Phelps took part in a study and collecting trip to stave churches and older secular buildings on his visit to Norway in 1943.⁸⁴ The material was not published until 1958.⁸⁵

The post-war period and a new direction

The Second World War represents in many ways a chronological and generational dividing line in stave church research. Church archaeology made its breakthrough in Scandinavia. In 1932, traces of yet another early wooden church were found in Lund, St. Clemens.⁸⁶ In Denmark the postholes from a wooden church were found during an excavation in Jelling in 1947. In the 1950s and 1960s, postholes were uncovered in Denmark and again in Lund, as well as on the Continent and in the British Isles.⁸⁷ The previously isolated stave churches in Norway and Sweden were now the survivors of a large number of vanished wooden churches in Scandinavia and large parts of Western Europe, as far south as the Alps. Wooden churches had been known from written sources, but now the physical traces of them

were emerging. The post-war years also entailed a change in designations and use of language here in Norway. Approaches to the Norse saga era and the Middle Ages took a different direction after the defeat of Nazism.

In Norway, research took two distinct directions: building sculpture on the one hand, as led by the art historian and Bugge pupil Martin Blindheim, and documentation and building archaeology on the other, with the architects Kristian and Håkon Christie as the forerunners. In time, church archaeology became a third line of research.

The research and documentation of the stave churches were linked to its maintenance. Oddly, it does not seem as if the building investigations during restorations and repairs in the interwar years had an impact on contemporary research discussions.⁸⁸ By way of illustration, two very extensive restorations of the stave churches at Høyjord and Heddal inspired only a few detailed building history investigations and documentation, and neither led to any published professional discussion.⁸⁹ Interests lay elsewhere. No real new direction in questions about stave church building research appeared before the results of the excavation at Urnes were published in 1959.⁹⁰

Postholes and church archaeology

Excavations inside the outer walls of the existing church at Urnes from 1955–1957 revealed postholes that were interpreted as traces of an earlier wooden church with a pentice.⁹¹ The lack of traces of wall planks in the ground indicated there had been wall sills running between the posts. Four postholes forming the corners of a smaller square in the middle of the floor were interpreted by Håkon Christie as posts for a roof construction. In other words the first church at the site had some form of elevated central interior space. If so, this would have an impact on ideas of a possible connection in construction methods transcending the change in religions.

The excavation work also showed that the northern raft beam in the existing church's nave, and the chancel's raft beam, had both been re-hewn and had meticulously-cut grooves on their undersides. Christie reasoned that these were construction elements that had not been used, but that had subsequently been re-worked for new purposes following changes in the construction plans for the existing church. He interpreted the postholes



Kristian Bjercknes (1901–81) was one of the many people from Bergen involved in stave church research and built up the Gamle Bergen museum with a large collection of buildings. Bjercknes was an important force in historic preservation in Norway. He took part in the investigations of Urnes stave church in the late 1940s onwards. Here he stands in front of the north wall of the chancel in Urnes. Photo: unknown, 1969.

as being from the same building as the re-used parts of the stave church, the north portal church. Bjercknes thought the re-hewn raft beams were sills from an earlier church with a sill beam frame. Bjercknes thought this was *after* the church with postholes and *prior to* the existing church; in other words, there had been two churches before the existing one. This intermediate church had a whole sill beam frame on the ground. Bjercknes thought this was the church which originally had the Urnes portal.

The excavations at Urnes supported the view that churches with interior posts had their origins in a pre-Christian central building with an elevated interior section. The site at Urnes revealed a link in this develop-

ment in an early church building dated at around 1050. Bjerknæs's viewpoint therefore contradicted Christie's idea of an unbroken line of development of churches with interior post constructions at Urnes. A church on a whole sill beam frame could hardly be expected to also have an earthfast roof construction. In his article "Kirkerne på Urnes" ("The churches at Urnes"), the Danish architect and archaeologist Knud Krogh finds fault with the interpretations of both Bjerknæs and Christie.⁹² On the basis of the excavated floor plan, Krogh deduces that there were traces of two earlier churches, both with corner posts sunk into holes in the ground. He notes that Christie's interpretation of the inner postholes as the foundation of an elevated interior space is not based on the archaeological evidence, but rather on the hypothesis of an evolutionary theory.⁹³ Krogh thinks there is a basis for a hypothesis of two churches prior to the existing one, but he warns about the lack of sufficient stratigraphic information. Over 40 years later, detailed surveying would provide more reliable results (see the section headed *Krogh's Urnes*).

Christie found similar locations of postholes under the floor of Lom stave church in the 1970s. He interpreted them in the same way as the Urnes postholes.⁹⁴ The traces of interior posts at Urnes and Lom have been given prime importance in Christie's view of stave church development history (see the section headed *Christie's stave churches*).

The postholes at Urnes placed the now-vanished, earlier Norwegian wooden churches in a clear Scandinavian and European context. Wall sill beams on the foundations above ground had been tacitly taken for granted in previous research into the early construction of stave churches in Norway. Earthfast constructions belonged to regions where wooden building craftsmanship was at a lower level. This view could no longer be supported. The many traces of previous wooden churches raised the question of when and where the transition, or preferably the development, made the leap from the different earthfast foundations to sill beam frames above ground. The excavation at Hørning Church on Jutland in Denmark revealed traces of a wooden church with corner posts anchored and sunken into the earth with intermediate posts in the long walls, but with no traces of wall planks in the soil. Knud Krogh considered this in the light of the remarkable discoveries at Stellerburg in Ditmarsken and Husterknupp near Cologne, both

dated to the 900s.⁹⁵ Foundations were unearthed at both sites and the lower parts of the walls on the wooden buildings had earthfast corner posts and intermediate posts with integral wall sill beams, but none of these were churches.

The pagan temple is written off – forever?

Work carried on in Norway throughout the 1960s. Post holes interpreted as traces of earlier churches were found in the medieval stone church at Kinsarvik. Remnants of two older churches were found under Kaupanger Church in Sogn and the traces of an earlier church were found beneath the ruins of the St. Mary's Church in Oslo. Over the years, traces of about 20 wooden churches with earthfast constructions have been discovered, as well as indirect traces of ten others.⁹⁶ Most are dated to various points in the 11th century. Furthermore, new traces of 11th century wooden churches were discovered in the 1960s in Lund in Sweden.⁹⁷ In his thesis "Hørg, hov og kirke" ("Altars, temples and churches") in 1966, the Danish archaeologist and historian Olaf Olsen challenged the basis for the debate about pagan temples (hov), stave churches and cult continuity. Olsen rejected the phenomenon of the hov as a distinct pre-Christian cult building and concluded that pre-Christian cult activities occurred outdoors in the open ("horg") or in the large halls of the chieftains. Olsen's critical examination of the sources killed the "hov theory".⁹⁸

Shortly after Olsen's dissertation were published, a number of small, so-called "gullgubber" were found – thinly-beaten gold amulets or offerings, often bearing human motifs, the undeniable traces of heathen cult activities, in a clear context with the remains of older buildings beneath the medieval church at Mære in Trøndelag.⁹⁹ The most recent of these was a wooden church with earthfast posts. The relationship between this church and the older buildings is still uncertain and the interpretations are under debate as a result. However, the discovery has not undermined Olsen's conclusions, with which Lidén also concurs.¹⁰⁰

In recent years, the excavation at Uppåkra in Skåne, Sweden, has unearthed traces of buildings that are interpreted as an unbroken chain of cult buildings on the same site from ca. 200 to 800 AD.¹⁰¹ This interpretation of the discovery has revived Lindqvist's interpretations of prehistoric cult buildings (no longer called hovs)

prior to the existing stave churches. Regardless of the discussions about the interpretation of the Uppåkra site, it rules out dating this connection to continuous construction activities into Christian times.¹⁰² The deep-rooted notion of a chronological, architectural link between pre-Christian cult buildings and stave churches still lacks empirical evidence.

The many German excavations in the 1960s of early medieval wooden building and churches, revealed traces of, among other things, wooden churches with wall sill beams on masonry foundations dating back in the 800s.¹⁰³ These were discoveries which were not considered in a Norwegian context before Roar Hauglid discussed them in the 1970s.

The situation after 1968

Views on early medieval wooden churches had changed considerably by the late 1960s compared to the situation 15 years earlier. The theory of the cult building continuity had to be abandoned, having occupied a position in stave church research since the days of Dietrichson. The division between so-called “primitive” and “advanced” building constructions could no longer be claimed as a national phenomenon, but rather it was deemed to be chronological, crossing Scandinavia’s national borders. The woodcarving’s connection with European Romanesque art was evidenced by Martin Blindheim, and the connection and grouping between the portals became clearer.¹⁰⁴ This also formed the basis for a more accurate dating of the stave churches based on style history.

In 1969, the art historian Peter Anker summarised the situation in the research.¹⁰⁵ Anker predominantly follows Bugge and Blindheim, but, unlike Blindheim, he raises the issue of Bugge’s interpretations of the Urnes portal and the large dragon portals including Hopperstad and Ulvik, and elaborates on them.¹⁰⁶ Anker raises the question of whether the Church could accept a use of images that could not be explained in a Christian context.¹⁰⁷ The stave churches still have precursors in Scandinavian building traditions stretching back to pre-Christianisation, but also relate to the Church’s demand for permanent, functional church buildings. He thinks that the question about whether the starting point was the basilica or the hov is wrongly stated. The stave churches with interior posts could have been an architectural innovation in the encounter between

older building traditions and the Church’s demands for how a house of God should be. The decorative forms are secondary to the architecture and the construction solutions.¹⁰⁸

Here lies an implicit methodological clarification: style analysis and building analysis viewed separately. The evolution of building techniques is no longer the explanation. The national background for stave church construction is replaced by, or more accurately, is dressed in, modern attire. Nordic national character and design sensitivity, with a love of woodwork, are exchanged for socio-economic factors as the explanation for the wooden church construction, perceived as an abnormal phenomenon in an international perspective.¹⁰⁹ The building of churches and stave churches is now seriously viewed in a broader historical and social context. This was a train of thought which was picked up.

From national characteristic to socio-economic models of explanation

In the post-war period, the distinction between the use of stone and wood for the building of churches had been explained on the basis of economic, demographic and cultural conditions. The first generation of researchers viewed the early wooden churches and wooden architecture as a specific Nordic and Norwegian phenomenon, linked to Nordic tradition and sensitivity to form and design. In the post-war period these national characterisations were down-played. By the end of the 1960s and into the 1970s and 1980s, demographic and economic factors gained increasing sway as explanations, a reflection of historical research’s awareness of landowning conditions in the Middle Ages.¹¹⁰ The choice of building materials for the churches is seen as an expression of cultural-geographical divides, in which the methods of construction and the woodcarvings were closely affiliated with folk art and rural handicrafts.¹¹¹ In contrast, the Romanesque stone churches are considered to be the building style of the aristocracy.¹¹² The spread of stone churches in the Late Middle Ages is partly linked to an expanding and more powerful Church and partly to the churches’ status in the church regulations or their association with central institutions of power. The choice of building materials thus reflects the extensive differences in social relations. Norway as an exception to this had its own social explanation.

This view has met with resistance and attempts have been made to clarify it.¹¹³ In cases where studies have been made of the local church economy prior to the Black Death in 1350, there is no conformity between church assets, local church revenues and the building materials. One point in the argument is that the Crown also built wooden churches, so they must be viewed as symbols of power, in the same way as stone churches. No canonical decrees have been found regulating Norwegian building materials. On the contrary, the Norwegian medieval laws regard wooden churches as the norm.¹¹⁴ Research has only briefly touched on the issue of whether other norms for building material than civil laws or church statutes could have been in effect in Norway, and this is worth looking at.

Hauglid and “the dating debate”

The then Director General for the Directorate of Cultural Heritage Roar Hauglid’s ambitious two-volume work on stave churches from the 1970s attempted to shift the agenda for stave church research.¹¹⁵ His conclusions found little support and were strongly criticised, mainly because of his choice of method and selective use of sources.¹¹⁶ On the surface, it may look like a disagreement about dates and datings, but at its core the debate was about the *basis* and *methods* for dating the stave churches. Which values or statements should be applied to the handful more or less fixed points for a precise dating of the stave churches? This was the question about interpretations of the sparse, complex source material, and partly about the use of source categories, such as inscriptions in the stave churches, manuscripts, rune stones, datings from archaeological discoveries, stylistic history analyses and more.

Hauglid rejects among other things a number of relevant written sources and instead builds on an almost uncompromising use of development typology as a method of dating. He links this to the development of stone architecture in Norway, to which he gives relatively late dates. He views stave churches along the lines promoted by Dietrichson, as wooden basilicas and therefore designates them as copies of basilica structures in stone in Norway. Hauglid dates the oldest basilicas in Norway as late as *after* 1150, which determines his dating of all the stave church material.

In the heat of the debate, the church archaeology

results Hauglid presented, mainly from post-war West Germany, received little attention.¹¹⁷ They were commented on, but key questions were overlooked, among them Hauglid’s reference to and discussion of Günther Binding’s discoveries of stone foundations of wooden churches with sill beam framing dated to the 800s and later.¹¹⁸ Hauglid simply sets aside the German archaeologist in his argument because the development in Scandinavia and Norway at that time had not come as far as that in Germany. By implication, things had to evolve before the development of sill-beamed buildings on foundations above ground. Instead of Binding’s church sites, Hauglid emphasises the so-called Husterknupp house, a secular building in Germany from the 900s, which Hauglid, for typological reasons, dated to the 11th century.¹¹⁹ The building had earthfast posts and sill beams that had been cut into the posts. A sill beam solution like this would have its final development in the form of a continuous sill beam frame, the prerequisite for the Nordic stave construction.¹²⁰

The value of Hauglid’s stave church books lies primarily in his analyses and descriptions of the individual portals. He also presented material that had previously received little attention, especially portals in the so-called “stone style”, also called *the Luster group*.¹²¹

Some of the debate might seem puzzling today. Dendrochronological dating methods are well-accepted in building research and have by large confirmed the style-historic dating which Hauglid wanted to disprove. Despite the factual datings, the debate led to the clarification on some key methodological problems and challenges regarding sources. The discussion also touched on the relationship between wood and stone architecture. The question about Norwegian basilica structures as prerequisites for churches with interior posts was neither discussed nor further developed. In this respect, a common position was held about wood as a distinctive material for church buildings.

With hindsight, it is thought-provoking that Hauglid’s archaeological overview was picked up and developed to such a small extent. This is probably due to Hauglid’s lack of attention to the German sill frame churches, the context in which he presented them, and his authoritarian manner.

Among Norwegian researchers, Scandinavia remained the main area of interest in the search for wall sill beam frames above ground. The Scandinavian, and

indeed the Norwegian, perspective regarding origins continued to dominate this building research. Warnings from a Dane, Harald Langberg, were heard, but had few adherents. Langberg tried to alter the perspectives, the parameters of understanding and interpretation, one might say, from an unarticulated folk orientation, to an ecclesiastical and aristocratic one in the major stave churches, and to turn attention away from Norway and Scandinavia to the vanished, secular and sacred wooden architecture in Europe.¹²² He asserts that the basis for general statements about the development of the structures is lacking because so much has disappeared. Different foundation configurations with and without sills are known and used independently and simultaneously over a long period of time. Langberg also points out that durable “earth free” constructions may have been overlooked, as they leave few traces in the ground and are hard to detect archaeologically.¹²³

Langberg’s perspectives and approach which were critical of sources received support in the debate about Hauglid’s books, and the point he made about “earth free” buildings’ lack of, or more precisely, meagre traces, was grasped. Nevertheless, this did not lead to any major changes in the dominant evolutionary theory, nor to criticism of sources or the reformulation of questions in building research.¹²⁴

Christie’s stave churches

Håkon Christie developed his views on stave church architecture and construction methods in numerous articles.¹²⁵ Through his research at the project *Norges Kirker (Norway’s Churches)*, and work at Riksantikvaren (Directorate for Cultural Heritage), he had considerable influence in the second half of the 20th century on church research as an architectural historian, a practicing archaeologist and through his comprehensive authorship. His basic views are unwavering in his writings. Elements are picked up and incorporated in line with contemporary professional discourse, but these do not result in any essential re-evaluations of viewpoints or the reformulation of issues and problems. His most extensive portrayal of the stave church question is the chapter on stave church architecture in *Norges kunsthistorie (The art history of Norway)* volume 1 (1981).¹²⁶ Here he discusses the historical context of stave church construction with an emphasis on the historical con-



Håkon Christie (1922–2010) at work surveying in the 1960s. Together with his wife Sigrid Christie, he devoted his life to the research project published as *Norges Kirker (Norwegian Churches)*. He and Kristian Bjercknes were responsible for the archaeological investigations at Urnes stave church in 1956–57. Photo: unknown, undated.

ditions during the erection of the churches in the 11th and 12th centuries, and especially the specific conditions in Norway with economic, demographical and cultural conditions which quantitatively limited the erection of stone buildings. Christie makes a justified estimate of 1,000 to 2,000 stave church buildings in the country in the Middle Ages, and refers to the problems related to sources: the limited amount of material that is preserved and known.¹²⁷ He warns against hasty conclusions on the basis of this scarcity of material and directs attention to the uncertainties this entails. He discusses the construction process of the stave churches and craftsmanship, and describes the elements of the stave building.¹²⁸ These are explained in light of Christie’s understanding of their technical development, not all at once, but element by element, in the same way as Nicolaysen and Dietrichson. The churches’ division into types follows what was established by Dietrichson, with a description and definition of the construction solutions and characteristics of each type. Here the author chooses what are viewed as typical or representative examples, or deemed to be ideal forms of the principle of a stave church, filtered through Christie’s eyes and presented in his words and drawings.

What is new is that Christie sees stave churches along two lines of development. He distinguishes the so-called

Møre type from the established evolutionary line, and views this type as a continuation of the Iron Age long-house with upright posts. He links the main line of development in stave churches to archaeological traces of earlier wooden churches, mainly in Norway, with references to Germany and Denmark.¹²⁹ These are seen in relation to pre-Christian building traditions and the heathen *hov*.¹³⁰ Christie discusses the architectural development as he sees it. Here too he follows Dietrichson's evolutionary scheme, in keeping with the dominant tradition, but he explains the development differently with regard to churches with interior posts. Christie, like Bjercknes and others, is critical of the so-called basilica theory because its starting point is in style analysis rather than an analysis of interior spaces and building construction.¹³¹ Like Bjercknes, he nevertheless accepts Dietrichson's typological development scheme. Christie details Bjercknes's retrospective method in building analysis and derives a basis for an assumed development in stave building construction. Christie thinks, as Bjercknes does, that the interior post chancel hangs on an already developed pre-Christian or secular type of building.¹³² This building type, now long gone, was a central building with interior upright posts.¹³³ The traces of churches with what Christie interprets as possible earthfast upright interior posts in Lom and Urnes, represent a stage in such a development. He thinks the decisive leap in construction, wall sill beam frames and raft beams above the ground, must have occurred long before the erection of the oldest surviving churches with interior posts, and he estimates the year 1100 as the earliest date.

This is how Christie interprets the archaeological church discoveries within the established development scheme. This scheme is a given, with no questions asked. No alternative or plausible interpretation options are discussed. Christie draws a straight, even line of development of interior post churches, with and without a possible elevated nave and chancel, mainly on Norwegian soil. The development leads to churches with interior posts, raft beams and sill frames. The church type is further developed in keeping with ideals about a more open church interior with a decreasing number of interior posts anchored in the raft beams. The development ends in the Gothic-inspired centre post churches, whereas the so-called Møre type is seen as a later, supposedly simplified – but certainly not *simple* – type. Christie's position is completely in line with Dietrichson's view

formulated 90 years earlier, but with modern names and explanations which encompass or absorb more recent results. This harmonisation between older viewpoints and newer empirical data sees centre post churches from the latter half of the 1100s as Gothic-inspired, despite this typology-based dating being incompatible with a stylistic historical dating at this time (1981).¹³⁴

The conclusions have cautious form of expression. Christie points out that there must have been a diversity of building methods and decorations, side by side, simultaneously. He also thinks that any answer to the question of the stave churches' origins will have to wait until research makes more progress.¹³⁵ Yet it is this very question about origin that he answers. As was the case with Dietrichson, reservations and criticism of the sources and the hypothetical character of the interpretations vanish when Christie draws lines and arrives at conclusions: The main outlines are clear.

What Christie does not discuss are the discoveries of prehistoric house sites in south-west Norway and their possible meaning in the discussion about the technical and constructional prerequisites for the stave churches. The archaeologist Bjørn Myhre pointed out in 1978 that as early as Roman times, stone slabs were used as supports below upright posts, and adds:

[...] perhaps wooden walls on sill beams were used as early as the Migration Period. The idea that these are improvements in building techniques that were first introduced in the Viking Age and the Middle Ages, as can often be suggested in literature about the oldest church buildings, appears to be untenable (see e.g. Hauglid 1976).¹³⁶

This is an issue which shakes the foundations of Christie's view of the development of stave building construction. If the sill beam frame was in use before wooden churches were built, there is no support for the theory of a steady rise in development from the postholes of Urnes and Lom to the evolved churches with interior posts, raft beams and wall sill beam frames on stone foundations. The interior postholes at Urnes and Lom must be given another explanation, such as holes left by scaffolding, as Knud J. Krogh suggests.¹³⁷ The fact that wall sills were in use in early wooden churches in Scandinavia was confirmed a few years later in the discoveries that Krogh and the Swedish archaeologist Anders W. Mårtensson made of what they interpreted

as the foundations of wooden churches with wall sill beam frames in Jelling dated to before 1100, and in Lund, dated to before 1050.¹³⁸

In his most recent work, *Urnes stavkirke (Urnes stave church)* (2011), Christie gives a detailed description of the standing stave church using text and scaled drawings, section by section, from raft beams to the ceilings and extensions. Where details are discussed, they are examples of what the author views as typical or representative, and thus the church is to some degree idealised in a literal sense. It is the *idea* of Urnes stave church which is postulated, as Christie sees it. His scholarly position is in the same place as it was in *Norges kunsthistorie* 30 years earlier. Any synthesis or questioning of the material is explicitly omitted. No comments are made about questions raised by research in the intervening years. However, he repeats his message: until stave churches are fully understood, “the priority is to investigate and document stave churches and submit the results in a satisfactory way”.¹³⁹ Therefore, Christie’s book is a catalogue of the way he views the church, founded on future research, yet devoid of defined areas for exploration.

The building process and building constructions – new views

A younger generation raised new questions and views about Norwegian stave church research. The architect Jørgen Jensenius has looked into ways of making foundations and planning wooden churches. On the basis of mathematical analyses of Lomen and Torpo stave churches, he says that the churches could have been erected using simple geometric models or dimensional measurements. He bases this on a number of sources from the early European Middle Ages, sources that elaborate on church buildings and ways of planning and positioning foundations.¹⁴⁰ Jensenius thinks dimensional relationships at Torpo and Lomen were used not just in the floor plan, but also between the building sections’ lengths, heights and the church’s overall size.

In his doctoral dissertation “Trekirkene før stavkirkene” (“The wooden churches preceding the stave churches”) he discusses the planning and building process for churches with earthfast posts, and finds concurrent relationships in the lateral and longitudinal measurements of a number of sites.¹⁴¹ The results,

especially for Lomen and Torpo, are thought-provoking, but to date have received sparse response among professional circles.¹⁴² Jensenius raises questions about time-honoured opinions about the so-called earthfast post churches as primitive, provisional buildings in his thesis and in a number of articles.¹⁴³ He says that the exterior of post churches did not necessarily have to be very different to a comparable wooden church with a sill frame.¹⁴⁴ Another key point is that holes and remnants of posts do not necessarily have to be traces of earthfast posts. They can be interpreted as stumps that have supported a continuous beam above the ground. Like Langberg (1972), he points out that earth fast wooden constructions are known to have been built after the oldest preserved stave churches, including traces of posts from a church in Åseral dated to the period 1180–1280.¹⁴⁵ Jensenius also raises questions about whether Røldal’s corner staves could have originally been earthfast, and mentions that two of the staves might have been capped as late as 1913.¹⁴⁶ Here he challenges the old, established view of a reasonably synchronous, typological development of medieval wooden constructions, with their chronology and their resistance to rot. Jensenius questions these deep-rooted perceptions and indicates alternative interpretations.¹⁴⁷ This challenges long-held views and approaches in the research tradition and opens the way for new problems to be explored.

The architect Ola Storsletten looks into ways of building roof constructions in stave and stone churches in his dissertation “*Takene taler*” (“The roofs speak”) (2002). This is the first review of the known, surviving roof constructions in Norwegian medieval churches. Storsletten groups the material according to typological characteristics and places the different types along what he sees as cultural and geographical lines of division.¹⁴⁸ He also follows this track in grouping details in the building constructions and in a series of systematic building investigations undertaken by the Directorate for Cultural Heritage’s Stave Church Preservation Programme.¹⁴⁹

Investigations carried out under the Stave Church Preservation Programme have also contributed essential factors to the question of a connection between typological incongruities and stave church architecture’s assumed development. A central question in this debate is the use of the diagonal cross braces, the

so-called “St. Andrews Cross”, together with horizontal string beams for bracing a number of stave churches with elevated central space in naves and chancels.¹⁵⁰ This bracing of the interior staves has been deemed to be a key typological characteristic and a basis for the mutual dating of church types. Churches with diagonal cross braces and string beams are supposed to represent a more highly-developed stage in the construction of churches with interior posts. The stave church at Borgund is viewed as an example of the epitome of stave church architecture; “the fully developed stave church”. Hopperstad stave church has both string beams and a diagonal cross brace which is claimed to be secondary in the church, which is dated to the 1130s. The church is thus a key monument in the discussion of the typology’s architectural history relevance.¹⁵¹ The investigations conclude that string beams and a diagonal cross brace must have been part of the building construction in Hopperstad from the very start. This technical solution has therefore been utilised as far back in time as we can follow among the surviving stave churches with interior posts. The connection between typological differences and architectural history is rejected due to its lack of empirical support.¹⁵² These conclusions are relatively new and are uncommented in the research literature.

Multidisciplinary and interdisciplinary perspectives

A broader perspective for research on the early churches and the early Christian era in the Nordic countries has been established in the last twenty-five years. Approaches based on religious history and socio-anthropology, and more general historic-economic approaches have supplemented archaeology as well as art and architectural history and clarified the picture of what sort of society – and who it was – that initiated the building of the churches.¹⁵³ In brief, the building of churches and the edifices themselves are seen in terms of the historical background and how this relates to social conditions. This has contributed to a greater emphasis on the prerequisites for stave church construction. A number of studies are also targeted at finite questions and individual factors. Written source material from more recent times, such as church ledgers and records, have provided important pieces for the stave church

“jigsaw puzzle”.¹⁵⁴ Research history reviews have posed questions about research traditions and approaches, as a part of larger works and as specific dissertations.¹⁵⁵

A tentative picture of the contemporary status of research was presented in *De norske stavkirken* (*The Norwegian stave churches*) in 2005.¹⁵⁶ The book tried to summarise central and relevant works and topics and suggest relevant questions for further investigation. In the ten years that have passed, the scope of research into stave churches and medieval buildings has declined sharply in Norway. The interdisciplinary approach to building research has simultaneously changed direction from the academic humanities and social sciences to a stronger interest in craftsmanship and the natural sciences.

Handicrafts and material analysis

This shift in interest became very clear in the Directorate for Cultural Heritage’s Stave Church Preservation Programme of 2004–2015 (see Sjur Mehlum: chapter 2). The programme provided limited opportunities for research, but new questions were posed regarding the importance of the implementation of construction tasks such as handicrafts, techniques, procedures, use of materials and material qualities. Traces of the use of tools and material treatment are systematically investigated to acquire more knowledge about the building processes (see Terje Planke: chapter 6).

Knowledge about historic use of materials, craftsmanship and the culture of tools has increased in recent decades. One example is Jon B. Godal’s works which have opened new perspectives for building research.¹⁵⁷ There is little doubt that this type of professional knowledge is essential for acquiring a closer understanding of stave churches as historical relics and utilising the buildings as sources. A visual analysis of materials and traces left by tools is not in principal different from an analysis of styles, but it requires a different type of knowledge.¹⁵⁸

There is a clear challenge in the confrontation between craftsmanship and academia. Observations and evaluations of the use of tools and working of materials must be open to re-examination and a critical scrutiny of sources. They must be documented in a way which is usable in a scientific context. The results of these investigations in the Stave Church Preservation Programme

have not been fully scrutinised, but the findings from the stave churches at Nore and Uvdal are an important contribution. They show what an analysis of material and traces of tools can tell us about the construction process, for example.¹⁵⁹ The results of investigations of several other stave churches will, when available, generate important new knowledge and also raise new, fruitful, interdisciplinary questions and problems.

Dendrochronology and building research

Tree ring dating – dendrochronology – has provided a firmer basis for dating based on stylistic analysis. Dendrochronology is helping to finalise the debate about the dating of central monuments in stave church research (see Terje Thun et al.: chapter 5). Non-destructive testing methods have also been developed. This has enabled tree ring sampling of materials which previously could not be analysed. It has demonstrated that trees used as timber to build a church could be felled over a period of several years. This raises questions about the time the construction process could take for an individual building. Tree ring analyses have proved to be very rewarding for the understanding of the qualities and the working of the materials used, providing a valuable, essential contribution to the understanding of the construction process and craftsmanship, as Terje Thun and others discuss in chapter 5. The results from Urnes challenge established opinions about the selected quality of materials in the church. Future systematic, comprehensive investigations into the working of materials by craftsmen and the qualities of the wood will provide a broader understanding of the stave church building process. Potential openings for research will be found here at the intersection of craftsmanship analysis, dendrochronology and building archaeology.

For research, it is essential to distinguish between the year a tree was cut and the year it was used in a building. This issue has not previously been given much emphasis in Norway in dating reports and in the presentation of datings of individual buildings.¹⁶⁰ The year of felling cannot be necessarily equated with the year of construction. Another major uncertainty is deciding how much emphasis should be placed on just a few samples when considering the dating of an entire building and thus drawing conclusions about the year of erection and the length of the construction period.¹⁶¹



Knud J. Krogh (b. 1932) joined Bjerknes and Christie in the work on investigating and documenting Urnes stave church. Photographed here in a discussion in the churchyard in 1969. Photo: unknown.

Tree ring dating entails a methodological leap for buildings research. Methods from natural science can, under given conditions, confirm or rule out hypotheses from other professional fields with regard to dating and the use of materials. Dendrochronology thus supplements traditional dating methods, but it is not infallible and does not replace analyses carried out on building archaeology or a study based on architectural and artistic styles. Tree ring dating must be considered in light of the source material and the results and methods of other disciplines, such as archaeology, building archaeology, material use, architectural history and style history conditions. This interplay of disciplines has proven fruitful in the investigations of Urnes, opening up new perspectives in stave church research and in building research in general.

Krogh's Urnes

Christie's and Krogh's books on the churches at Urnes illustrate different approaches to the stave churches, as Ragnar Pedersen discusses in chapter 8.¹⁶²

Krogh's book presents a radically different approach to Christie's with concrete, detailed arguments and scaled survey drawings. Krogh reaches his conclusions on the basis of accurate measurements of the re-used construction elements: the foundation of the Urnes-style church was above the ground. Two churches have been found on the site with earthfast foundations. Krogh finds that the Urnes style church was narrower than these and therefore must be the third church on this site.

The Urnes-style church was very probably a rectangular stave church without an elevated nave and chancel. This church had a foundation with sills and staves on dry rock and with two juxtaposed interior spaces: a rectangular nave and a narrower chancel. Krogh concludes that this church does not provide enough proof for the hypothesis of the unbroken line of evolution in stave church architecture from simple, earthfast churches, initially without and later with an elevated nave, and on to the surviving churches with interior posts. Here, Urnes, with its re-used materials and traces of earlier churches, is central as evidence. It follows, therefore, that the line, postulated for over a century, from churches with interior posts back to possible earlier building types from pre-Christian times, is still without proof. On these grounds, Krogh raises many questions for future research, including the fields of building sculpture, church archaeology and stave church architecture. Krogh's main point here is that future research must look at the material for what it is. It is not feasible to establish knowledge without also describing the actual conditions as accurately as possible, and then to interpret them freely without any links to preconceived opinions.¹⁶³

Portal research – major trends and questions

Martin Blindheim's book *Norwegian Romanesque Decorative Sculpture* (1965) placed portal art in a solidly concrete context. This proved to be beneficial for later research.¹⁶⁴ Here he sees motifs and models primarily in English and English-influenced Norwegian stone sculpture, as well as in English manuscripts. The motifs from stave church portals and woodcarving are seen as

examples of the European Romanesque pictorial arts and sculpture. Boëthius and the Polish-English art historian George Zarnecki had earlier suggested a possible connection between Hopperstad and the cathedral at Ely, England. Boëthius had also pointed out Lombardian motifs in the so-called Sogn-Valdres group of stave church portals.¹⁶⁵ Blindheim pursues this idea, and clarifies in greater detail the connection between Ely – Hopperstad, and views the cathedral at Lund as the starting point for the Lombardian motifs in stave churches, but transmitted through the Lombardian-influenced churches in Bergen, such as the Munkeliv abbey church. He builds upon Dietrichson's divisions into portal groups and clarifies these groupings. Blindheim discusses the portal wood carvings in a contemporary historical context and brings early Romanesque stone sculpture in Norway into the discussion. The stave church woodcarvings and the stave churches are, like the stone sculpture and the stone architecture, examples of professional craftsmanship of varying quality, carried out by specialists. With a clearer, concrete international background, Blindheim also paves the way for a sharper, relative chronology in portal woodcarvings. His results and approach are the starting point for all later research.¹⁶⁶

Researchers have subdivided groups along different lines and used different designations, but this has not affected the basic methodological approach.¹⁶⁷ No collective presentation or catalogue of the Norwegian stave church wood carvings had been available until Erla Hohler's doctoral dissertation *Norske stavkirkeportaler* (1993), rewritten and published as *Norwegian Stave Church Sculpture I–II* 1999. Here she continues with the earlier divisions and creates fine-meshed groupings, based on a complete examination of known stave church wood carvings.¹⁶⁸ In addition to grouping and dating of the portals, the professional discussions have revolved around their association with stone sculpture in Norway and abroad, iconography and the meaning, the origin of the large jamb portals and craftsmanship and production issues.

In Ely and other churches in England, Hohler, like her predecessor Blindheim, finds close parallels with specific motifs in the early jamb portals at Hopperstad and Ulvik. She shows that parts of the same group of motifs are also found in the cathedral in Trondheim, which has the country's largest catalogued collection of building sculptures in stone from before 1150. Her

hypothesis is that motifs were transferred in groups as the craftsman's total repertoire. When parts of one motif group are missing in Trondheim, but are found in the stave church sculpture and in England, Hohler reasons that the missing parts of the motif group must also have existed in Trondheim.

The Rennebu portal, the wall frieze and portal at Vågå and the Romanesque woodcarving in Urnes are all linked to the Trondheim material. Therefore, Hohler proposes that the pilgrimage city of Trondheim was the place of origin for most of the known early Romanesque stave church woodcarving. The hunt for a centre of diffusion raises the question of how far one can go in making deductions from missing, or lost, material in one place, and building upon fragments from another.¹⁶⁹ The largest group of preserved portals, the Sogn-Valdres group, has datings which span over 100 years from the oldest to the youngest. The longevity and dispersal of the Sogn-Valdres portals is, as Hohler emphasises, very unusual in medieval building sculpture. She questions whether the geographical spread can be explained by woodcarvers having books of drawings which showed the composition, using specific geometric patterns of lines and circles. Sketchbooks as patterns for sculpture are well-known from the Continent.¹⁷⁰ The hypothesis is tempting and plausible, but no such drawing books or sketchbooks have been found in Norway and the chances of confirming or rejecting the hypothesis are small.

Hohler summarises and discusses three alternatives for the origin of the jamb portal. It may have a background in a pre-Christian society; it may have come to the country with Christian missionaries as part of a "church package" or it may have emerged at home in Norway or elsewhere in the Nordic countries during the phase of Christianisation. She concludes that decorated jamb portals may have existed in Scandinavian wooden architecture prior to Christianisation.¹⁷¹ These three alternative models have an impact on how one views the relationship between wood and stone in architecture and sculpture. The wooden sculpture and portal motifs that have survived could in principle have been passed on directly from wooden architecture abroad without taking the route through Norwegian masonry and stone construction.

Hohler makes a key point here about possible views regarding the relationship between wood and stone architecture and sculpture. If the models for the stave



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churches' building sculpture, portal motifs – and architecture too for that sake – are brought in from abroad, then stone sculpture and stone architecture in Norway are relegated to another position and level of relevance in the discussion of stave churches. At its core, this is a methodological challenge stemming from the source situation. This quandary has not really been tackled in the research debate.

There is relatively broad agreement about continuity in composition from Urnes to later portals, even though the motifs are different. However, Knud Krogh states clear opposition to this.¹⁷² He points to the differences, rather than the similarities, and emphasises that the Urnes portal was originally part of a continuous façade frieze. This is a major difference from all surviving exterior wall carvings, which are limited to the portal planks. The only exception is Vågå, with its wall frieze. Here he is in agreement with, among others, the art

historian Signe Fuglesang.¹⁷³ Regarding the motif and composition, he sees a breach between the door frame in the Urnes frieze and the later jamb portals of Sogn-Valdres type, such as the west portals of Hopperstad and Borgund. Krogh points out that the upper sections at Urnes consist of symmetric, entangled beasts, whereas the Sogn-Valdres portals depict three battling dragons. He stresses the differences in composition and scale between the Urnes-style church and the woodcarving in the later stave churches.

The question of the possible meaning of the stave church portals has been extensively debated.¹⁷⁴ Only two preserved portals have biblical motifs and for them the answer is clear. The large majority of portals, however, lack religious motifs or messages, judged by what we understand today. In portal research there is broad agreement that the stave church woodcarving and the portals are art from the Christian era, and so questions and answers about their meaning have to be seen within the framework of a Christian perspective or outlook. The view of the Urnes portal as “heathen” has been rejected by nearly every scholar who has dealt with the issue for decades.¹⁷⁵ The issue now is whether the Urnes portal and later portals should be viewed as allegorical or symbolical pictures with a religious message, or whether they are simply ornamental.¹⁷⁶

Bugge’s interpretation of the dragon portals as allegorical depictions of the day of Judgement has generally been accepted by a number of researchers, with various explanations and emphases.¹⁷⁷ The motifs from the Saga of the Volsungs have also been interpreted as allegoric image depictions, in which the dragon slayer Sigurd is viewed as a parallel to St. Michael and St. George.¹⁷⁸ The decoration of the church portals is therefore seen as bearing a message with a clear evangelizing function, while the animal motifs can simultaneously be viewed as guards who mark the transition from secular to sacred ground. In Norway, it is Hohler who has argued the most strongly against such an approach. She thinks the jamb or dragon portals are general decorations without a particular religious function and they could have been inspired by portals from chieftain halls, which means they might have a non-Christian origin.¹⁷⁹

In her thesis on the Urnes portal, Elin L. Pedersen pointed out how there is an ambiguity of motif and function in the Swedish rune stones and picture stones, which could represent faith, kinship and property

rights.¹⁸⁰ The Urnes frieze can thus be seen as a ruler’s symbol which encompasses social and religious aspects as well as political power. This view also raises the question as to whether the portals and friezes, like those at Urnes, could have had a meaning in chieftain halls as well, or in other secular contexts not related to the Church, such as the Swedish rune stones in the Urnes style. Taking this a step further, the question arises about the extent to which preconditions in people’s ideas and approaches to religion may have changed in the course of the 200 years between the Urnes portal and the later jamb portals. These questions have barely been touched on to date.¹⁸¹ The question of a possible liturgical function of the portals has not been raised in stave church research.

All in all, one can say that in the current situation there is wide agreement that most of the surviving woodcarvings in stave churches do not represent folk art. They are products created by highly professional craftsmen, comparable to the sculptors who worked in stone. There is also agreement regarding the main classification of the portals and stave church woodcarvings. Shifts and new clarifications will continue to emerge, and individual investigations may shed new light on old questions and illuminate new ones. There is also extensive agreement on the European influence. Questions involve the Scandinavian preconditions and the relationship between pre-Romanesque and Romanesque portals, where Knud Krogh stresses the differences rather than the similarities. The connection with Lombardian-influenced English sculpture is well-substantiated. Yet the Continental and German material, especially the Rhine-Lombardian material, has received little scrutiny with regard to possible connections with stave church woodcarving. This represents a large, complex and resource demanding field of work for future research.

Comparable queries can be raised regarding the relationship between Norwegian and other Nordic wooden portals and portal fragments.¹⁸² The question of the portals’ significance and meaning is still open to further discussion. More recent research into the link between architecture and liturgy in Nidaros Cathedral in Trondheim makes this issue topical and relevant for the stave churches as well.¹⁸³

While a theoretical possibility has been raised, no evidence has been found yet linking the jamb portals to secular forerunners. Nor has clarity been reached in

the discussion of the preconditions for the portals. The interpretation of the Urnes portal as a symbol of power raises in turn questions about the social context and background of the other stave church portals.¹⁸⁴ However, we may lack sufficient source material to pursue this particular issue. The final word can hardly have been said about Trondheim as a centre for the dissemination of Romanesque stave church woodcarving.

Hohler's analyses of the portal craftsmanship, and her views on its production, have brought important new perspectives to portal research.¹⁸⁵ Further work in this field calls for interdisciplinary approaches and knowledge of materials and craftsmanship. Craftsmanship, production and the formation process also link to relevant topics worth pursuing in construction research. They have been central in the building investigations carried out under Directorate for Cultural Heritage's Stave Church Preservation Programme (see Mehlum's chapter 2 and Planke's chapter 6 in this book).

The Swedish material has only featured to a lesser degree in the Norwegian discussions, despite an array of important individual investigations of, for example, church sites and building materials on the island of Gotland.¹⁸⁶ Important sections of this material were presented in the comprehensive exhibition catalogue *Frühe Holzkirchen im nördlichen Europa (Early Wooden Churches in Northern Europe)* 1981, edited by the architect and museum scholar Claus Ahrens.¹⁸⁷ A host of articles from the Nordic countries, England, Germany and France have presented information about complex, fragmented wooden church material. The views this catalogue published have only to a lesser degree engendered new directions amongst Norwegian researchers, perhaps because Ahrens's comprehensive article followed the well-trodden evolution-oriented path through the stave church material.

From Sweden in the following years came two very important volumes of *Sveriges Kyrkor (Sweden's Churches)* which give a presentation of the known material from landscapes in southern and southwest Sweden.¹⁸⁸ The material is extensive, but fragmentary, and is discussed primarily in a typological perspective. Unfortunately a planned third volume, about the stave churches of Gotland, is still unfinished. It will provide more material and enable deeper discussions and comparisons with the Norwegian stave churches, amongst others. Mariann Ullén provides a summary of the Swedish medieval

wooden churches in *Signums svenske konsthistoria (Signum's Swedish art history)* (1995).¹⁸⁹ The relationship with material from other Nordic countries is not discussed.

Although Danish church archaeology has provided important contributions to discussions among specialists in Norway, the results of archaeological work on churches in the Faroe Islands and Greenland have never been highlighted.¹⁹⁰ Krogh thinks churches similar to those on the Faroe Islands and Greenland could have been built in Norway. Here are clear issues for research in future church archaeology, as is also the case with the Icelandic material.¹⁹¹ This has yet to have an impact on Norwegian stave church research. Ahrens's major work, *Die frühen Holzkirchen Europas I–II (The Early Wooden Churches in Europe I–II)*, was completed and published posthumously in 2001. This is an extensive work with a survey of surviving wooden churches, archaeological finds and churches known from written sources from all over Europe, covering almost a millennium. Ahrens attempts to summarise this enormous amount of material in lines of the architectural development of wooden churches. Of chief value today is the overview of archaeological sites, buildings, written sources and specialist literature.

Summary

The pattern is complicated when one looks back and tries to gain a perspective on some 180 years of stave church literature, not unlike the impression gained from a first viewing of the Ål portal. It is a tangle of entwined elements spreading in a dense carpet that prevents any attempt to distinguish a system. Established truths stand like columns on either side of the opening to the consecrated space, guarded by the great names in research, like the capital lions devouring the poor sinners. Some parts of stave church literature, as read later, bear witness to a strong belief and conviction of a presumed past development, one where actual knowledge and facts have fallen short of providing an explanation. As in all research, postulates have been made which seem far more like religious tenets.

Long standing ideas are found in stave church literature, in both the views of stave church development and in the methods used. The dominant issue has been present from the start, both in building research and in



The west portal of Ål stave church, Hallingdal, is one of the most important of the preserved stave church portals. It is dated to around 1150. The opening is 252 cm high, 80 cm wide at the bottom, reducing to 71 cm at the top. The apparent wilderness on the sidepieces consists of spiral vines, small writhing dragons and wild animals. At the top are two dragons facing each other, biting a smaller, central dragon. The carved half-pillars each carry a lion about to devour a human. The significance of the motifs is much discussed. Photo: Ann Christine Eek, undated.

portal research: the relationship between the domestic, i.e. Scandinavian, and the foreign, whether it is the seed or the soil that is decisive, to borrow an expression from the historian Jens Arup Seip. From its rudimentary start, portal research has had a perspective involving comparisons and has operated with European artistic and architectural history as a frame of reference. This is because the connection with contemporary European sculpture was so obvious. It has also entailed contact with international specialists' development of methods and theories, together with an orientation toward relevant research abroad. The discussion here has revolved around what is domestic and what is foreign, but not about the basic understanding that it is a mixture of the two.

This was not the case when building research on stave churches gradually coalesced. In the 1800s the stave churches were lone swallows in "the innermost landscapes of Norway", to repeat the phrase of the painter J.C. Dahl. A comparative perspective outside the country's borders could only be based on written sources and the single preserved Greensted Church in England. This not only affected the explanations of the origins of the stave churches, as seen in Nicolaysen's and Dietrichson's basilica theory, it also impacted on research methods and approaches. The soil was Scandinavia or Norway, but where did the seed come from? Put simply: portal research has continuously operated with a diffusional perspective, the seed came from Europe. The evolutionary explanations took hold early in building research, as reflected in Dietrichson's categorisation into types. Schirmer cemented the typology for the years ahead, throwing out source criticism and cultivating a national, Norwegian perspective regarding the origin and development of the stave church. This left tracks in the Norwegian specialist literature that followed, and in popular perceptions about stave churches even today. It might be symptomatic that Kielland's reservations about Hopperstad and the typological development were untested for almost a century.

Put simply, building research in the last hundred years can be seen to revolve around national and popular outlooks, cloaked in changing fashionable garb. It is puzzling that models that provided explanations with a national bias were allowed to dominate in Norway more strongly after the turn of the last century. Knowledge about individual churches expanded, and increasingly more material about Swedish stave churches was put

forward. However, this failed to result in any essential reorientation in views or the consideration of problems deserving further attention.¹⁹² The framework of understanding was largely fixed and still has an impact. The stave building, especially “in its most developed form”, must have grown out of Scandinavian, and ideally Norwegian, soil, and with domestic preconditions, whether one now sees a homespun development in a Scandinavian or a Norwegian perspective. Within this frame of understanding, we found and still find the different views in typology, stave building origins and architectural development. In other words, since the days of Dietrichson all the pieces of the puzzle have been on the table; the discussion has been about their location and designations.

Dietrichson’s style analysis of building construction can be seen as a necessity, given the material and methods available to him. As the English architectural historian Peter Kidson points out, this is fully in keeping with contemporary art historians’ viewpoints: “[...] they were interested in all the arts, and treated buildings as aesthetic experiences rather than structural problems [...]”.¹⁹³

The basilica theory was once a very obvious explanation to a riddle: the unique stave churches in Norway. Since then, the remains of a three-figure number of medieval wooden churches have been discovered across the whole of northwest Europe. The long life of the basilica theory provides a useful image of how “necessary” explanations survive a changing research situation and have lives of their own, detached from their original context.

Wood or stone – deviations and norms

The idea that wood is a deviant or abnormal element in historical church architecture is a basic and often unexpressed, but essential, aspect of stave church literature. Stone is viewed as the primary and normal material. Wood can imitate with ornaments that have no structural function. Decorative elements are used in a struggle against the natural form of the wood.¹⁹⁴ Nobody argues about what the natural form of stone is, understandably. Nor is it deemed a problem in this context that portal elements in stone can also exist as pure sculpture – an “ornament” – without a structural purpose, in the same way as the stave church portals.

In this way, church architecture in wood is seen as essentially different from church architecture in stone. Similarly, stave church sculpture is seen as essentially different from stone church sculpture. This is not a difference determined by the materials’ physical properties. Stave church sculpture is evaluated on a different scale. Implicitly, by definition wood is the *other*, something more, it is a marker of the people and down to earth. Put simply, stone is judged *descriptively* as a given, whereas wood is evaluated *normatively*, as an imitator. This perception is not universal: most recently Fuglesang has made a powerful argument that the stave churches should be viewed as ordinary church architecture, and with good reason.¹⁹⁵ To view wooden sculpture and wooden architecture in a normative way will miss the point that decorative forms from wooden architecture also can be also found in stone architecture. This interaction is a characteristic of an architectural and sculptural diversity bridging building materials.¹⁹⁶

In building research history we find an integral tension in the view of the stave churches, a tension which is not always palpable and it can revolve around two opposing poles. In a hackneyed, simplified form, the poles can be designated as “elite art” and “folk art”. Where stone churches and sculpture enter the broad European church building tradition and are gauged accordingly, stave churches are seen in light of (vernacular) wooden architecture in general, not in the light of their function and purpose.

In a historiographic perspective, building sculpture, or woodcarving, if one will, is evaluated within an art-history and architectural- historical horizon of understanding. This realm of comprehension is different for the stave church architecture, which is dominated by ethnological approaches. The building material and the possible construction methods define the basis for comparison. Here we see an unbroken line from Dietrichson via Schirmer, Meyer, Boëthius and Phleps to Lidén, Bjercknes and Christie.

Stave church research is naturally dominated by the Norwegian material and also by Norwegian researchers. When Norwegian building research has looked beyond its borders, it has generally been to the southwest and the British Isles. The most important innovations for over a century, however, have come as a result of archaeological discoveries in Scandinavia and the Continent. Despite that, the surviving Swedish stave church

material has been treated as a parallel phenomenon in a Norwegian context. Generally, this has been viewed as a variation of no special consequence for the fundamental features of the presumed development, which is read like time-honoured practice into the Norwegian material. A watershed in Norwegian stave church research would not be seen until the extensive discoveries of the post-war period. The postholes from southern Scandinavia had their counterparts in Norway. The early wooden churches became an incontestable Scandinavian phenomenon. New empirical evidence was absorbed and incorporated into well-established views. It could be said that the Norwegian stave churches did not become less Norwegian, but rather more so. The postholes at Urnes and other places represented tangible proof of a further development which further south was prevented by stone building. It is significant that the German Husterknupp house from the 800s occupied a prominent position in the debate, as, for instance, a stage in stave building evolution. The German sill beam churches on stone foundations from the same time have practically been overlooked. So too has Bjørn Myhre's focus on the sill frames in Iron Age houses, also incorporated in summary works as late as in 1997 and 2005.¹⁹⁷ The emphasis has been on postholes, rather than the traces of datable stone foundations. It is remarkable that established views have formed and held on to approaches and questions in such a strong grip for several generations.

Current issues

Research in the past 15–20 years has, to a large extent, formed the basis of a new agenda. Old, revered positions and habitual truths are incompatible with new factual research. The stave churches cannot be seen as an isolated Norwegian phenomenon. The idea of a step-by-step, synchronous development of stave construction, such as Langberg warned against in 1972, cannot be maintained. Different building methods for wooden constructions and wooden churches have coexisted over a long period. Wooden churches had earth foundations in Norway long after the existing stave church at Urnes was built. At Urnes it has been established that the

former church – “the Urnes-style church” – was raised on a sill frame with a stone foundation shortly after 1070, about the same time as, or later than, the wooden churches with sills on stone foundations in Jelling and Lund. The Urnes-style church had, in all probability, a rectangular nave with a smaller chancel to the east. The form and volumes provides no basis for the hypothesis of this church as a link in an incremental development toward stave churches with free-standing interior posts and elevated naves and chancels.¹⁹⁸ The stave churches' construction typology as an image of an architectural development lacks an empirical basis and cannot be maintained. These are factors that are important for how research should formulate its problems for discussion.

The literature on stave church architecture is very concerned with the issue of origins: a question about wooden church architecture which no longer exists, or at best has only left fragments of buildings and archaeological traces. The power of statements regarding such material can appear significant in some contexts, but it will still be limited. The “primal source” can never be grasped. The source situation is recognised, but are the existing sources fully exploited? If not, how can they be further utilised?

It might seem paradoxical that the very question which can be proved to a very limited extent, or not at all, has dominated building research to such a degree. However, questions for discussion, that really can be answered on the basis of available material, have only been stated and discussed a little. A first step must be to accept the available sources and channel energy into making as much use of them as possible. This does not entail avoiding syntheses. It means that such syntheses need to be based on stronger foundations and questions. Problems for consideration must be constructed in a way that can lead to answers and form the basis for further work. The buildings are there and have not been fully surveyed. The stave churches are not a single mass. Better knowledge of these monuments is called for, and better standards of comparative analyses are required, for the constructions, the designs and the use of materials. The major challenge now in stave church research is not a lack of material, but the lack of research, empirical evidence and suitable methods.

8. A COMPLEX FIELD OF KNOWLEDGE

Empiricism and theory in stave church research

RAGNAR PEDERSEN

The stave churches represent material fragments of an historic reality. They are the relics and remains of the actions, intentions and impacts of a period in time. This applies not only to the actual origins of the stave churches but to the whole time they have existed up to the present day. The stave churches originally functioned in a specific culture and under distinctive social conditions, which appear remote and strange to the people of today. Those visiting the stave churches can feel this very strongly. One of the reasons is that these edifices are tangible and visible. Their presence is of an entirely different nature and offers a very different experience to written accounts, which only convey something beyond themselves. For modern humans, the stave churches represent an encounter with, and a way into the Middle Ages. The fact that there are very few of them (28 have survived in a more or less complete state in Norway), that the architecture is unfamiliar and the distance in time is great, all increase the intensity of the experience. As well as being important historic monuments for communicating the cultural history of the Middle Ages, the stave churches also represent a vital resource from an academic perspective. It is this aspect of them that will be highlighted and discussed here.

The stave churches are not only valuable for Norwegian art and cultural history. They also attract major international academic interest, because medieval wooden churches are very rare in Europe. Hence the stave

churches are irreplaceable, both as cultural monuments and as a scientific source. A stave church is experienced as credible by the visitor, as the real past, and as authentic by the researcher, as an object to which one can return time after time, either to look for new information or to verify previous research results. For these reasons, the stave churches must be preserved in the best possible way.

The benefit of research history

The core of an academic investigation of the stave churches is to have a clear idea and awareness that the stave church represents an historic relic, in a source-related understanding.¹ This provides a lead for the issues that may arise and the methods that can be used. A fundamental discussion of the basic academic questions makes it easier for us to understand the opportunities and challenges that are faced in stave church research.

What is striking in looking at the research that has been done on the stave churches in Norway is that clear, precise questions are largely missing. They are there, to some extent, but as a rule are only implicit in the text. The questions we ask form the basis for academic progress. This applies not only to issues that can be directly supported in a responsible way using source data, but also to clearly-expressed hypotheses of a type that can be



Borgund stave church. Lithographs published in Dahl's book from drawings by J.C.Dahl's pupil Franz Wilhelm Schiertz (1813–1887).

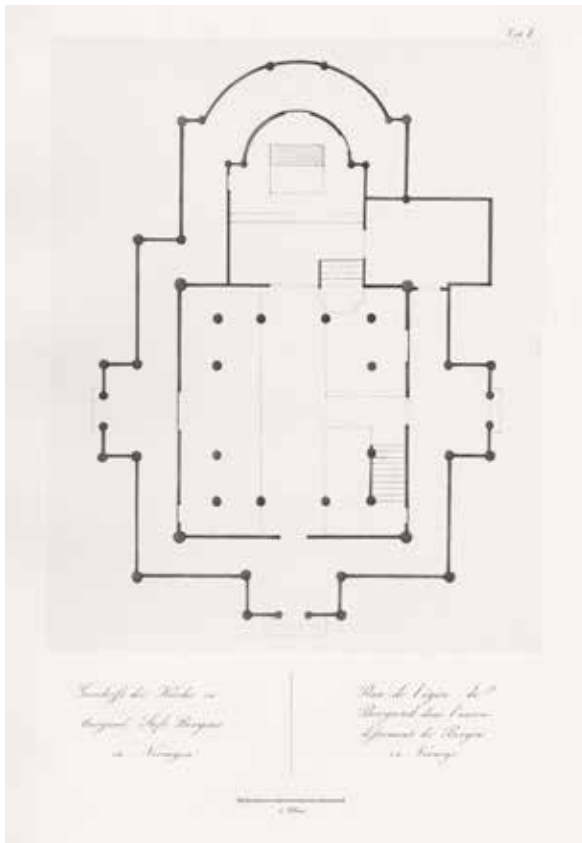
characterised as musings and speculations. These often give rise to creativity and daring, and are a progress factor in every discipline that can be characterised as living.

A concrete example of this is Urnes stave church. Over the centuries this has been the object of many hypotheses concerning the age, development and design of the building. Many of the results presented by the earlier researchers have now been rejected due to new data and more persuasive arguments. An important publication in this area was Knud Krogh's *Urnesstilens kirke* (*The Urnes-style church*) (2011). This does not mean that the old hypotheses and research results are worthless. The issues that arose earlier present an important platform for differences of opinion and professional objections which spark creativity, even today. For this reason research history is important, not just from the point

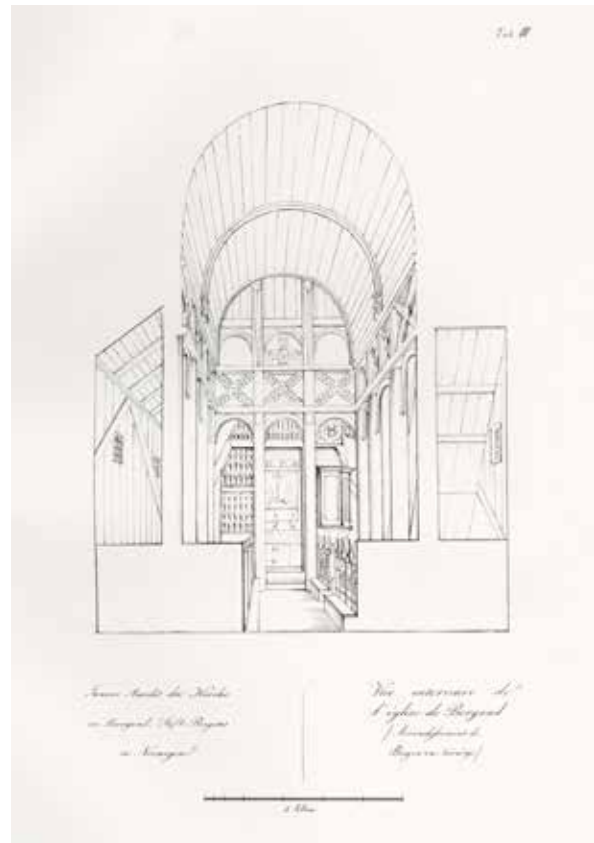
of pure historical interest but also as an active tool in today's discussions and hypotheses (see Anker's chapter 7 in this book).

The research history forms the basis for looking in more detail at the questions that were relevant at different times, and the scientific methods that were deemed to be relevant and important. As well as asking questions that are precise and clear, traditional or daring, it is also important to look at another characteristic of the development of research. This is the intensity of the research in a limited, defined problem field, i.e. whether there are areas that have always been the object of in-depth, critical discussion and areas that have been neglected or where research has been inadequate.

The study of stave churches in Norway has largely been linked to some specific university disciplines. This



Borgund stave church. Lithograph published in Dahl's book from drawings by J.C.Dahl's pupil Franz Wilhelm Schiertz. Floor plan showing a post-Reformation sacristy.



Borgund stave church. Lithograph published in Dahl's book from drawings by Franz Wilhelm Schiertz., the interior perspective shows that the church had a barrel vault, galleries and fixed benches.

has had consequences for the choice of hypotheses and the theoretical basis. Research into the stave churches has, for the most part, come from the disciplines of art history and architectural history, to a rather limited extent. Since the middle of the 1950s, archaeology has contributed vital source material and new viewpoints. This has meant that the history of the stave churches has acquired a greater time span than before, back to the early days of Christianity in Norway, the origins and the oldest phase of the churches. However, in general, and from an historical research perspective, stave church research must be deemed to be somewhat narrow in its thematic approach.

Hyper-complex buildings – a challenge for research

From a more cultural history-research position, the stave churches must be regarded as hyper-complex. This implies that a building is principally the result of many different cultural factors that together create a complex network of cultural relationships. This must surely also apply to the stave churches.²

It is fundamental to every academic analysis of the stave churches to anchor the building in time, space and social environment/conditions. Clarifying these factors is a major research task in itself. With this type of fundamental cultural basis, the stave churches can be analysed further from some general criteria: design, construction and technique, use, meaning and underlying values. These aspects belong together to a greater



Borgund stave church. The photograph shows one of several window arches and windows dating from after the Reformation. Windows, arches, the sacristy, the galleries and most of the fittings and decoration from the 1600s and 1700s were removed during the restoration in the 1870s. The stave churches played an important role in developing a national identity. The history of the stave churches had to be traced back as far in time as possible, and at least to before the union with Denmark, so that they could be perceived as an expression of something uniquely and genuinely Norwegian. This meant that there was little interest in the post-Reformation history of the stave churches when the stave churches were first restored. Photo: unknown, pre-1870.

or lesser extent, and comprise the building's assumed cultural context. This type of holistic perceptiveness opens the way for many investigative perspectives and a wide field of explanation. This approach builds on a research perspective that maintains that a cultural object is best explained when it has been widely analysed, which means that there can be multiple ways of understanding. This does not mean that all context factors are equally important, but that there is an overview of the whole field of explanation and so it becomes easier

to judge which issues were of major significance. The context changes over time so that it is also essential to study the stave church as part of an historic process where origin, continuity and change are important analytical concepts. Such a broad approach contrasts with a conceptual analysis that is only done from a single, narrow perspective where the understanding is often one-sided and categorical. In such cases there is reason to ask whether important issues have been omitted.

Every academic discipline represents a segment and a condensed abstraction of reality. This has to be the case if research is to be manageable. When stave church research has been largely driven by architectural and art historians, there is, nonetheless, an inherent danger here. University disciplines are normally driven by specific interests and some absolute fundamental theories, even if these change over time. The answer to this problem is to be aware of the stave churches as a multi-disciplinary and inter-disciplinary field of research.

Professor of art history Lorentz Dietrichson issued his work *De norske stavkirker. Studier over deres System, Oprindelse og historiske Udvikling* (*The Norwegian stave churches. Studies of the system, origins and historical development*) in 1892. This first systematic academic treatment of the stave churches was of major significance for later stave church research. We can clearly see that subsequent research has attached itself to the issues Dietrichson raised. There is reason to maintain that this has created a specific research tradition that has persisted almost to the present day. Typical examples are Rolf Mowinckel's *De eldste norske stavkirker* (*The oldest Norwegian stave churches*) (Oslo, 1929) and Anders Bugge's *The Origin, Development and Decline of the Norwegian Stave Church* (Copenhagen, 1935). I have already indicated how continuously going back to the same research field can mean in-depth analyses and critical testing of old research results. On the other hand, this can create a research tradition that is so strong that it bars the way for new points of view. If, instead, the stave churches are regarded, as with every other building, as multi-faceted, it is undoubtedly necessary to fine-tune and add to the established research tradition.

In recent decades, a deeper understanding and a more refined methodology have occurred in relation to traditional themes in stave church research.

More recent studies in architectural history and iconography

As examples some art history dissertations can be used as a starting point. Altar frontals and painted chancel ceilings in particular have been the subject of thorough investigation.³ For the most part, these have been considered based on aspects of architectural history, aesthetics and iconography. However, these objects can also be looked at from a functional perspective, as part of the total church fittings and the complete liturgical space. In this way a possible connection between buildings, inventory and equipment, and use can be discussed. This way of thinking means that the stave churches are not fully explained and understood if their religious function and significance are not included. It is easy to ignore the fact that the stave churches have been places of religious practice, a space designed for a particular type of church liturgy and ritual.

The wood carving in the stave churches has always been an important theme in stave church research, especially the carvings on the entrance portals. A comparison has been carried out between the surviving stave church portals with major and minor common characteristics and what are assumed to be individual variations. This method has made it possible to establish a development typology and, derived from this, a relative chronology between the different portals. Since these are strongly linked to the building itself, a dating of the building is also obtained. Architectural style analysis can also indicate common craftsmanship characteristics or “schools”. Erla Bergendahl Hohler’s major and thorough work, *Norwegian Stave Church Sculpture*, I–II, which was published in 1999, has provided new, solid and substantiated knowledge.

What has been discussed to a lesser extent is the carving on the portals and other decorative details as an expression of a particular way of thinking and specific perceptions. To some extent, attempts have been made to interpret some of the images with reference to Old Norse literature; the most famous come from the Hylestad porch (from Setesdal), which shows scenes from the *Volsunga saga*. Many stave church portals are very richly decorated: the so-called Sogn-Valdres group, which have particularly intricate patterns, are especially fascinating. By looking closely, one can see fighting dragons, lions or other animal heads, and not least intertwining vines. The great significance of the portal

is further emphasised by the doors being fitted with a richly-ornamented lock. The ornamentation must also originally have had a specific meaning and significance.⁴

Some will maintain that this question cannot be answered in an academically-justifiable way. In the written sources from the Middle Ages, there is no direct information about the underlying ideas behind stave church decoration. Hence one has to be satisfied with the purely architectural history investigations. Nonetheless, there is reason to assume that some progress can be made by using a *hermeneutic* method, i.e. different forms of interpretation, supported by systematic argumentation.

The decoration on the stave church portals has, as mentioned, previously been analysed on the basis of visual, formal assessments, the characteristics of architectural history. Medieval man most probably did not see it like that. For him there was no sharp distinction between the tangible and the intangible, between the outer design and the content of the idea. There were smooth transitions between these forms of recognition. This type of dynamic understanding will undoubtedly provide a more in-depth view of the stave churches as a highly complex cultural phenomenon. It is possible to gain an insight into the medieval way of thinking through Old Norse literature and by using folklore material retrospectively, extrapolating from more recent material.

The tangible and the intangible

By using a hermeneutic method it may be possible to allow the stave church decoration and ideas derived from different types of written sources to supplement and illuminate each other. Examples of such interpretations are where the monumental door openings in the stave churches are seen as a marked divide between the sacred and the profane.⁵ The many animal motifs that are portrayed in dramatic and aggressive positions may have been intended to represent the conflicting forces of life. Such conceptions can be found in more recent popular belief, where a world dominated by different forms of powers is a central idea.

The intensive investigations into portal decoration in recent years have been highlighted here for a number of reasons. A traditional field of research has been considered in greater depth and has been substantiated. The conclusions have become more precise and have been

substantiated. What is missing is a *wider* understanding of stave church portals.

From a theoretical, academic point of view, stave church research has until now been dominated by a positivistic attitude where academically-based conclusions can be drawn simply as a result of what can be observed and analysed. More use of indirect conclusions and interpretive perspectives could well provide a multi-faceted view of the stave churches.

Another example which shows how a traditional field of study can be discussed in a new way is a discussion of the origins of the erection of the stave churches. This question was raised in an article by Leif Anker from 2001, *Om stokk og stein. Middelalderens stav- og steinkirker i lys av økonomiske forhold (Posts and stones. The medieval stave and stone churches in the light of economic conditions)*. Here Anker investigates whether economic factors played a role in wooden stave churches being constructed at a specific site, rather than churches built from stone.

The ongoing theme in these discussions has been to investigate the significance of using multiple perspectives and a wider contextualisation than has been usual until now in stave church research. In this way, it is possible to have a general view of the greatest number of plausible explanatory factors. However it is also important that there is more in-depth analysis and critical verification of previous research results. This also provides an increasingly stronger basis for the conclusions. The ambition to set the stave churches into a broad cultural context is a challenging scientific task. It is easy to raise objections to this type of historic reconstruction, because essential core data may be missing or the argumentation may be too weak. However, such a broad approach is still important in order to acquire relevant understanding of the stave churches, and the objections must be dealt with in the best possible way.

In order to draw up a more closely-woven context around a construction, a broad spread of data and a good ability to combine different data source types are required. With new perspectives and advanced source combinations, it is undoubtedly possible to obtain a deeper and broader understanding of the stave churches. However, it cannot be denied that access to sources is limited.

With regard to the individual stave churches, in many cases we lack written information which could provide

precise data about the year of construction, the owner and the craftsmen. Nor is it likely that in the future we will come across very many such forms of written information which can provide answers to such questions. The source situation is somewhat better if we look for general factors that may have affected the reasons for the origins of the stave churches and their position in society. These could include legislation and the church authorities' views on the church, the liturgy and the congregation, and, similarly, general social conditions are worth taking into consideration.

From observation to documentation:
creating new source data

The stave church is the object of study, but as a relic of the past it is also its own source. The scientific challenge is that the source data is not directly accessible and readable, even though the level can vary from the obvious to the more closed and indirect. The data must first be discovered and deemed to be interesting and relevant; then the observations must be linked to concepts and converted into written form.

The majority of findings will concern *visual* observations. The findings and descriptions that we make form the basis for further analyses and more in-depth research. For this reason the documentation process as part of the investigation of a stave church is highly important, both as a source and to enable access to new, undiscovered data. For this reason it is somewhat surprising that this side of stave church research has not received much attention.

The documentation can have many blind spots. This particularly applies to details, for example in connection with restoration work. A standard documentation routine is to draw and photograph what is observed and the characteristics that are deemed to provide knowledge. However, if written documentation is not attached, the documentation is often incomprehensible and inaccessible. As source data, visual findings must be linked to concepts and described to provide full meaning. The background is that most of what we see could easily be taken as given: there is nothing special that attracts attention. There can be much unarticulated, tacit experience behind the documentation work carried out by an outstanding expert, for example an architect or specialist craftsman. For those who do not have the

same knowledge and level of understanding, there is a danger that relevant knowledge contained in the documentation could be lost.

Normally, the weakest link in the documentation work is the logical transition from observations to conclusions, the actual justification. It is seldom expressed explicitly. This is an ambitious goal but it is necessary, particularly because the documentation work is often an undervalued phase of the research process. In reality, documenting and drawing conclusions are advanced forms of academic work. In this field, stave church research has an opportunity in the future to acquire new, important source data from previously overlooked material. This is discussed in more detail in the chapter by Terje Planke.

One could ask whether the documentation work that is carried out using surveys provides more information than was known already. Obviously one might have ambitions to obtain better, more exact surveys than those carried out previously. More significant is having a clear opinion that survey work can itself involve active source creation. Surveys consist of choosing and interpreting a complex reality. It is therefore important that one is aware of the purpose and the professional understanding of such survey work.

Documentation requires a specific research perspective

In connection with maintenance and restoration work, surveys and other forms of documentation are often made. Because the stave churches are particularly important sources of Norwegian medieval history, they need to remain as authentic as possible. For this reason it is of great importance that all interventions and changes are documented. In this way it is possible to know at any time what has been done with the building; what is original and what is the result of newer actions. Another purpose of good surveys is to serve as a safeguarding measure; an essential precaution in the event of an unexpected, catastrophic destruction of the building.

More analytically-targeted documentation can undoubtedly provide previously unknown source data. However this assumes that documentation is combined with a research perspective. For example, it might concern understanding and explaining a stave church's inventory, construction and technique, both

in detail and as a whole. Here it is source-critical that what is documented is not normative in its approach and its assessments, but is open to the assessments and rationality of the past, such as, for example, choice of material quality. Another analysis perspective, combined with different types of documentation, could be where one focuses on traces that can tell something about the church's inventory in the Middle Ages, such as, for example, altars, choir screens, benches and all the church fittings. A clear but narrow documentation perspective can undoubtedly provide new data, but one-sidedness presents us with a dilemma. There is a risk that observations that lie outside the documentation process could be overlooked; observations that in another research context could be of great value. There is no definitive solution to this challenge other than using several different approaches.

With the help of an intensive, architectural-history investigation with a sharper focus, even the smallest traces, which had previously been overlooked, can have major significance from a purely knowledge-related point of view. Analytically, they often have a so-called *indicative value*; this involves traces that refer to underlying knowledge and bigger connections. They can also be key facts in understanding the construction as a whole. One example is details of joints and inserts. Other traces may reveal a specific type of tool marks and detailed studies can provide information about the quality requirements and standards for craftsmanship; and how the stave church construction manages to withstand the forces of wind and snow.

Previously, it was maintained that written context data from the Middle Ages is limited. However there is reason to assume that more intensive architectural history analyses represent potentially vital knowledge for future stave church research.

A central element in every dynamic research process is to continue the work to improve supporting and convincing conclusions, and not just to increase the knowledge capital. The research results need constant revision. One way of doing this is to look more closely at other researchers' ways of thinking based on specific theoretical premises which themselves form the background to the questions, reasoning and conclusions. Such fundamental academic assumptions are often characteristic of their time, and, seen from a distance, can quite easily be revealed. The research history of

the stave churches provides much material for such a discussion, right from Lorentz Dietrichson's work from 1892 and to the present day.

In the above I have emphasised some aspects from general academic theory, illustrated with some specific examples. In order to formalise and discuss these principles further, I will now consider some central research work on the stave churches.

Theories and their limitations

In his pioneering work, Dietrichson was already trying to create order and a system for a confusing amount of material which was sometimes random and not always representative of what once existed. Today, there are deemed to be four main types of stave church, based on construction and characteristics. They share degrees of technical complexity, from a simple rectangular church with a chancel to the so-called central nave church with a raised nave, supported by freestanding columns and a complicated bracing system.

In older stave church research, the differences between the stave churches were assumed to be time differences. How the stave churches relate to each other in respect of age and thus a general chronology of the Norwegian stave churches, has been an important question, right up to the present day. Dating is vital in history. Dating enables the establishment of relevant, reliable, time-related connections. Nonetheless there is reason to question why dating, chronology and in particular the beginning – the very point of origin – have been such a problematic question in Norwegian stave church research. I will try to answer this question later.

Because there are few written sources from the Middle Ages that can tell us anything about the age of the stave churches, a dating method has been used that builds on typology and relative chronology. The dating criteria were different design characteristics in the construction, which indicated different phases of development, from the simple to more complicated solutions. In this way different phases could be demonstrated. This typological system of objects assumed a general underlying developmental process, independent of location. It was not only a tool for determining age, but also an axiom. The fundamental research view is that the culture must be understood as a continuous, cohesive process; a development. It implies that the

step-by-step changes can be explained from the original design and the opportunities for change that lie within it. Dietrichson followed the research paradigm of his time, in history and archaeology, for example, when he drew up his stave church chronology.

Around 1900, another dominant explanatory perspective arose in cultural research, known as diffusionism. This was an attempt to understand changes and cultural variations as the result of cultural impulses and the diffusion of culture. Methodologically, this meant that the object being investigated had to be studied in its cultural-geographic context. One much used starting point for these diffusion studies when it came to stave churches was the decoration of the porches, in particular the ornamentation. With the help of visual design analyses, and comparative studies across a large geographical area, there were opportunities to demonstrate common design characteristics among the selected objects. Small details in particular were revealing. This method made it possible to form an opinion about the centre of dissemination, dissemination paths and the speed of dissemination. Based on a defined, dated object, a relative chronology could be built up.

The weakness with 'explain-it-all' perspectives such as evolutionism and diffusionism is their one-sidedness and very general nature. Another problem is that they neither open the way for other types of cultural processes nor take into account the complexity of the culture. Throughout the inter-war years the analyses of the stave churches became more refined. A combination of developmental and cultural dissemination studies was used. This involves demonstrating tradition and impulses, indigenous development and external influences, continuous development and breaches in continuity. All such cultural processes must have been decisive for stave church design over time, but from a scientific point of view it is very difficult to determine which has had the most influence and has been the most decisive.

These key words suggest a highly dominant direction in the investigation of the stave churches right to the present day. As we will see, this research paradigm is particularly evident in Roar Hauglid's books on the stave churches. He trained as an art historian in the 1930s and retained the same research perspective throughout his life.

Dendrochronological dating provides a more secure chronology

The development of typologies aimed at establishing a relative chronology and architectural history analyses is not an absolute dating method regarding the stave churches. Together with traditional methods, tree ring dating – dendrochronology – had a break-through around 2000, a fairly precise date. The problem with tree ring dating is that it tells us when the tree was felled but not when the materials were used. In 2005, Leif Anker wrote that the dendrochronological dating carried out so far did not deviate significantly from architectural history analyses and other dating methods.⁶ More specific dating of the stave churches opens the way for new, more precise hypotheses. The stave churches can, to a greater extent than before, be regarded as individual, ‘one-off’ objects. This creates the opportunity to carry out comprehensive studies and assess how different cultural processes play into the building’s history, including individual craftsmanship characteristics. This is discussed in more depth in the chapter by Terje Planke.

Materials in Høyjord stave church in Vestfold were dated using dendrochronology in 2013.⁷ Ola Storsletten’s report presented a number of interesting results. It was shown that materials from an older church, dated to about 1170, had been reused, while the current building was deemed to date from about 1300. The dendrochronological dating appears to coalesce well with the architectural characteristics of a Gothic nature. Hence the timescale appears to be well-justified.

The investigation of Høyjord stave church raises several fundamental questions from a traditional developmental perspective, and in particular about the types of changes to which this building bears witness. Many can also be the bearer of traditions. In this perspective the Gothic decoration in Høyjord stave church may be less significant. What is interesting in this construction when it comes to the question of change, is the actual stave, or post-construction. It deviates significantly from the traditional methods, as we find them in the other stave churches in Norway. Special characteristics include the use of intermediate posts and joints between individual construction elements. The question then is whether this construction deviates significantly from the older buildings; whether technically it represents an improvement or a simplification. In the investi-

gation it is maintained that: “Høyjord stave church can be interpreted as the start of something that could have been a real change in stave construction (sic)”. The conclusion appears to build on the claim that the construction of Høyjord stave church was the result of domestic developments, and had it not been for the Black Death around the middle of the 1300s, this development would have continued. This would not necessarily have been the case.

The stave construction, such as we find at Høyjord church, could just have easily been the result of influences from the Continent, not only in terms of details but as a complete concept. As we shall see, there were various types of framework constructions on the Continent in the Middle Ages. Another problem is that we know very little about the construction methods of the stave churches in South-East Norway.

Overall, stave church research lacks a more in-depth discussion about the background to the regional variations between the different stave church types. There are grounds for discussing whether this is due to general development and diffusion processes, or to local deviations due, for example, to finances, access to materials and traditions. More precise dating using dendrochronology opens the way for such a view. A methodological problem in this context is that a clearer distinction is needed between a development that is understood as a cohesive process, and changes, deviations and exceptions, than has so far been the case.

The national story of the origins of the stave churches

Here the word story is used to mean a simple, easily-understood summary of a complicated historical situation, built up along a long timeline and with a distinctive storyline with a plot and a motive. The stave churches’ long and volatile history invites such a fascinating narrative. It is not only about disseminating knowledge; it is also linked to society’s value system. To put it another way: the story is often characterised as being mythological, in an academic sense of the word. It must legitimise and explain specific values.

Stave church research history is closely associated with the emergence of Norway as a nation state, and as an aspect of the development of national ideology. For this reason, it was necessary to trace the history of the



Høyjord stave church in Vestfold after building works in 1848, with large windows, panel cladding and ceramic tiles on the roof. Photo: Riksantikvaren



Høyjord stave church after the extensive interior and exterior restoration, completed in 1953. The roof became steeper, with a new tower and a tall spire supported by a central mast. The panel cladding is new, and old window openings have been re-installed with lead glass. Photo: Birger Linstad, Riksantikvaren.

stave churches as far back in time as possible and at least to before the time of the union with Denmark (1537 – 1814), so that they could express something that was distinctively and genuinely Norwegian. This meant that the stave churches' post-Reformation history was not given much attention. For the first generation of stave church researchers, this was a symbol of the Danish era and national decline. In their pure and original form the stave churches were an expression of a distinctive wooden architecture that is almost exclusively found in Norway. Hence the earliest history of the stave churches was the most interesting, before foreign influences had begun to make their mark to any great extent. This is an important background to the strong interest in stave church research and the origins of an independent “Norwegian” development.

An illustrative example of this way of thinking can be found in Dietrichson's pioneering work on Norwegian stave churches. He believed that the simple, rectangular stave church plan with a chancel was the original design. It was inherited from the pagan temple, a single hall with a separate chamber, as buildings were designed at the end of the Viking era. The Vikings allegedly took their idea of a temple from England, the so-called Anglo-Saxon church plan. Dietrichson, however, believed that the actual building construction and technique built directly on domestic traditions

from pre-history. Furthermore it was his opinion that stave churches with a raised centre part, “the wooden basilica” were a brilliant imitation of the foreign stone basilica. This way of thinking gave rise to a vivid narrative about our stave churches, from pagan times to the Christianisation of Norway and to the establishment of the different designs of the stave churches.

After Dietrichson, new hypotheses were put forward about the origin and earliest development of the stave churches. Since these have not really been proven empirically, they are naturally somewhat speculative. Only when archaeological investigations below the stave church floors began was there access to new source material. This was the start of a close cooperation between the archaeologists and the art-history tradition in stave church research. In this way the history of the stave church could be traced further back in time.

More recent hypotheses on the origin and development of the stave churches

Important findings are traces of churches that had posts sunk into the ground as the load-bearing structure and a simple, rectangular floor plan. At present some 20 churches of this type have been uncovered

in Norway.⁸ Similar wooden churches from the 1000s have been found across Europe which must represent the first Christian churches. The oldest stave churches in Norway thus have clear international precursors. Remarkably, it is not this design that has received the most attention in Norwegian stave church research in recent years.

What has particularly occupied research in Norway are aspects of the stave churches that can substantiate a long pattern of development and particularly the assumed transitional designs such as the transition from posts sunk into the ground to a sill frame upon the ground as the base for the load-bearing construction. Another important characteristic in this respect is the raised centre nave which is found in some stave churches and was assumed to have its origins in a pre-Christian cult building.

What was innovative in this regard was the archaeological investigation at Urnes church which took place between 1955–57 in connection with the Directorate of Cultural Heritage's maintenance work.⁹ For a number of reasons this church was well-suited to studies concerning its development. In the extant church, materials were found that had been reused from an older building and archaeological excavations found traces of a post-type church with a pentice around on three sides, according to the head of the excavation, Håkon Christie. Of particular interest was evidence of posts within the church, which were interpreted as the remains of a load-bearing construction for a raised central nave.

In 1996, the Danish archaeologist Olaf Olsen published a major work *Hørg, hov og kirke (Temple, sanctuary and church)*, which reinvigorated the discussion about whether there had been a continuous development from pre-Christian building to church. Using in-depth text-critical studies of Old Norse literature, he came to the conclusion that the pagan temple could be excluded as the starting point for the oldest stave churches. The reason for this was that according to the sources, the temple had not been a specific cult building but a hall for cult-related shared meals. Instead, Olsen clung to the idea of an open-air sanctuary to rescue his theory. This appears to have had a cult statue in the centre surrounded by an ambulatory and possibly a raised nave. This theory must be characterised as speculative with little empirical support.

Just a couple of years later the discussion arose again about the origins of the stave churches. The occasion was the sensational archaeological finds in Mære church in Trøndelag.¹⁰ In connection with the excavations below the church floor, not only were traces found of a church with posts, but also a thick layer of animal bones and a compacted layer of cooking stones. The most interesting find, however, was the so-called “*gullgubbene*”, small, thin gold amulets portraying what is taken to be the god Frøy. Looked at in connection with earlier information, it is important to take into account that the Old Norse sources talk of Mære as a central cult site. Hence the source data clearly bears witness to their having been cult activities at the site before a Christian church was built here. Here there is an example of cult continuity on the site in the transition from pagan to Christian times. However, there is no source data to maintain that there was also continuity with regard to the design of the cult building.

Debate – the route to scientific progress

Two comprehensive works about stave churches were published in the 1970s, written by Roar Hauglid: *Dekor og utstyr (Decoration and inventory)* (1973) and *Bygningshistorisk bakgrunn og utvikling (Architectural history background and development)* (1976). The books had the best intentions: a new survey of the stave churches in Norway, with particular emphasis on dating and chronology. This was an area with which Hauglid had been working for a long time. In *Fortidsminneforeningens* (The Society for the Preservation of Norwegian Ancient Monuments) annual report for 1969, he published a long article about Urnes stave church. For this reason Hauglid must have had a good knowledge of the stave church debate. Hence it is quite surprising that his major work on the stave churches did not receive more attention in scientific or academic circles.

It might be asked whether his research results were too controversial and broke too much with the traditional views to be acceptable. Colleagues may have been negative to his categorical manner which allowed little room for doubt and counter-argument. The conclusions, which are mostly in the form of postulates, are presented with great authority. Nonetheless, it is not necessarily wrong to have a fundamental scepticism to established research results and to be clear in one's

formulations. This can lead to debate and reassessment. The weaknesses in Hauglid's academic thinking lie at another level.

The reason why his work is discussed here is not primarily the research results *per se* but how they were arrived at. Such an angle for further discussion is helpful when highlighting some of the scientific and theoretical principles I have presented earlier, and on this basis to point out some obvious weaknesses in Hauglid's academic methods and research perspective.

The basis for Hauglid's stave church chronology is Urnes stave church which he dates to around 1200. This dating has consequences for the other stave churches in Norway: they then move up the timescale and are thus deemed to be 40–50 years younger than had been generally assumed. Another point with Hauglid's stave church chronology is that he links it to medieval stone churches. In order to get the dates of the stave churches and Romanesque stone churches to coincide, the latter must also move up the timescale. What Hauglid actually did was to revise the chronology of the medieval churches in Norway.¹¹

We will look in greater depth at some of the central tenets of Hauglid's research perspective and arguments. He was clearly inspired by strong historical source critique. This meant that he almost dogmatically rejected dating made with the help of written sources from the Middle Ages, as he deemed them by their very nature to be dubious and unreliable. He maintained that runology had created the fatal starting point for dating individual stave churches: "the art historian asked the runologist and the runologist asked the art historian".¹²

The first fundamental critique of Hauglid's stave church books from a scientific and academic theoretical perspective was an article in *Historisk tidsskrift* (*Historical Journal*) for 1977, written by the art historian Peter Anker. This is the first time in Norwegian stave church research that we find this type of debate. Anker emphasises the significance of using combinations of sources when it comes to dating. This is in contrast to Hauglid who primarily uses the building alone. In order to support his dating hypotheses, Anker claims that archaeological observations, assumptions about style and information from medieval documents must all be used. If multiple independent sources point in the same direction, the conclusions must be deemed to be well supported. With this understanding, Anker can

be described as a critical empiricist. He also points out other characteristics of Hauglid's research perspective which have already been discussed above, and notes that "Hauglid often lacks the documentation to support his views and assumptions".¹³ Anker feels so strongly about the need for broad arguments and clear conclusions that he also thinks that issues that run counter to the conclusions proposed should also be included in the discussion.

In many of his architectural history works, Hauglid is concerned that there should be agreement between the dating of a given building, the economic situation at the site and the location in relation to an assumed centre of innovation. This argument – a form of contextual thinking – is used by Hauglid as an argument in favour of his stave church chronology. His new dating is based on the predecessor to the extant stave church at Urnes. Here there is a significant amount of reused material, including the north porch with its characteristic animal ornamentation. Hauglid links these to the church with the posts sunk into the ground that archaeologists found under the church floor. Traditionally, the Urnes-style has been dated to the middle of the 1000s and hence the predecessor to the Urnes church we see today must date from that time. Hauglid maintains that this dating is wrong and suggests a date shortly after the 1100s.

Hauglid's main argument for this conclusion is based on assumed general historic assumptions. He thinks it is unreasonable to believe that a small parish church in Sognefjorden would have built this type of church with its advanced construction as early as the middle of the 1000s. For example, at this time Stavanger was not yet a bishopric, and St. Drotten, a central church in Lund in Sweden, had a relatively simple plan (around 1060). Archaeology has shown that this construction had palisade walls sunk into the ground and was not raised on a sill frame as in the surviving Norwegian stave churches.¹⁴

Anker's counter-arguments to Hauglid's new dating of the older Urnes stave church are based on a visual architectural history analysis and comparisons with other, better-dated objects. An important tenet in his argument is the reference to Swedish rune stones with Urnes-style ornamentation, which have been dated to the middle of the 1000s. Anker also uses context arguments to strengthen his dating of the older Urnes stave church. The dating of the Swedish rune stones with

Urnes-style ornamentation is historically plausible. They may have been intended as a memorial to men who had died on Viking voyages overseas, where they had been baptised Christians, i.e. a testimony to the process of Christianisation.¹⁵ Based on these arguments Anker adheres to the traditional dating of the Urnes-style and hence the older stave church at Urnes.

As I have shown, context arguments play an important role in the discussion between Hauglid and Anker about the age of the stave churches. The reasoning they use can only be characterised as a type of reasonable conclusion. The conclusions they reached have had to fit in with, and belong to, general historic conditions. This is a much-used method in historical research. However, this method of justification is not without its source errors. As long as the date of the object is in doubt, the context surrounding it can only be postulated.

More recent research at Urnes has more or less fixed Anker's dating of the church from where the reused material emanated. (There are further comments on this elsewhere in this book) What is significant about the debate between Anker and Hauglid is not so much the research results but rather the recognition of the different research perspectives, ways of thinking and ways of portraying the results. This is where the significance for the future lies.

Stave churches in Europe?

In one field, Hauglid was creative within Norwegian stave church research. In the second volume of his work on the stave churches, he presented for the first time a large amount of archaeological material from wooden buildings from different places in Northern Europe, right back to the 800s. Good preservation conditions meant that it was possible to study not only the foundations but also the lower part of the building. In this way it was possible to obtain an impression of the building construction as a whole. Hauglid's survey of this source material is accompanied by good illustrations and reconstruction drawings of the presumed design of buildings. The material Hauglid presents should, from a comparative perspective, have had major significance for how the Norwegian stave churches relate to European wooden buildings in the early Middle Ages.

However, Hauglid did not make great use of this material. It was not analytically based in Norwegian

conditions and remains somewhat isolated, as an indeterminate "background". The challenge in the methodology and the conclusions for Hauglid lay in the gap in time between his established stave church chronology and the dating of timber structures in Central Europe as demonstrated by archaeologists. He saves his dating theory by maintaining that was no direct cultural influence between these areas.¹⁶

In principle there is reason to be somewhat sceptical about such an all-encompassing, under-nuanced theory. It undoubtedly creates a form of order for a large amount of unclear material. Whether it describes and explains a complicated, historic process is another question. It may well seem as though an independent, parallel development based on multiple impulse centres and local innovation could have occurred. Hauglid particularly emphasises the explanation of the growth of stave churches with a centre post and a raised nave, of which we have a number, against a European background. The problem is that he cannot document any forms of transition from simple post churches to churches where the construction rests on sills and a raised nave. Hauglid refutes this objection by saying that sills do not leave traces in the ground and thus cannot be proved by archaeology.

The archaeological material represents many types of timber structures, both in principle and on a detailed level, and many of the constructional elements that are typical of Norwegian stave churches are recognisable in the archaeological material. What is particularly striking is the similarity between the surviving stave churches and other timber structures from Northern Europe when it comes to the different joints, for example in the corners, and between the different methods for fixing upright panels to the sills. Many of them are technically advanced, exact and made with great care. These are fundamental elements in all timber structures.

At Husterknupp Castle, in Ertal, near Cologne, traces of a building with load-bearing posts buried in the ground have been found, and between these, sills have been nailed in as a structure for attaching the wall planks.¹⁷ Hauglid sees this method as a developmental stage towards the construction that is found in the stave churches, where the whole construction rests on a framework of sills. Buildings with internal posts, as in a three-section plan, were relatively widespread according to the archaeological material from northern Europe.

We cannot conclude from these archaeological finds that there could have been a raised centre nave, but this cannot be excluded.

Hauglid's survey of a large amount of architectural history material from before the year 1000 shows that in Europe at this time there were many different types of timber frame constructions and details. However it is also clear that the first Christian churches were simple buildings with posts set directly into the ground. A large number of these have been discovered below later stone churches. However, stave churches with a more complex construction form, such as the Norwegian type, have not been found in connection with archaeological excavations beneath the churches.

Based on the material presented by Hauglid, we can see that all the stave churches' construction elements were known in northern European secular architecture, at latest around the year 1000. This gives reason to question what types of building constructions were being used in Norway at the end of the Viking era and the start of the Middle Ages.

Archaeological finds in Norway can tell us something about this. For the most part these only involve floor plans and in principle the type of building construction that were being used. Even though the details are missing, it is clear that many of the buildings were constructed using different forms of timber construction and with a three-part plan. We can recognise this type of building in western Norway in particular. Based on this it could be claimed that the first stave churches in Norway were erected using a technique that was well-known, if not necessarily as technically advanced as on the continent. A question that arises in this context is why the first church buildings were not built using the notched log technique?

Why churches in stave and notched log techniques?

At the beginning of the 1000s we must assume that the notched log technique was starting to be used in Norway and was certainly in use from the 1200s onwards. From then on we have surviving timber buildings which show a very high standard of craftsmanship, particularly in the eastern part of Norway.

At this point in time the notched log technique must have made its mark on the landscape and thus one might

expect that churches would be built using this technique. Nonetheless it can be seen, based on the surviving stave churches, that the stave construction was preferred.

One example is Ringebu stave church. Ringebu occupied a central position in a church context as the one-time seat for a canon closely associated with the bishopric at Hamar. The background to choosing a non-contemporaneous building technique when Ringebu stave church was erected at about the beginning of the 1200s was probably due to poor finances, rather than a lack of suitable materials or craftsmen, or cultural isolation. It was clear that a new church was wanted on the site of the old church where archaeologists found posts sunk into the ground, and has been dated to 1000–1090.¹⁸ The use of the stave church design when the new church was built at Ringebu must have been a conscious and deliberate decision.

One of the few to have raised the question why stave churches were built after the notched log technique had taken hold was Professor of Ethnology Hilmar Stigum. His explanation is that "people were used to encountering the sacred in stave church buildings".¹⁹ Expressed in a more fundamental way, the reason for a stave church's traditional design can be sacred conservatism. This approach shows some of the limitations that affect typology and development. They explain some elements but are incomplete from a more general historical perspective.

Documentation as registration: Håkon Christie

From 1969 onwards, new, in-depth investigations were carried out at Urnes stave church. Since 1956/57, when traces of earlier buildings were found by archaeologists under the floor of the church, a wide-ranging debate had gone on about the history of the building and its possible predecessors. Central to this debate were Kristian Bjercknes, Håkon Christie and Knud Krogh, who had some conflicting opinions about the building's history. Based on increased experience within church archaeology and an expectation that a close investigation would provide good results, a major publication was planned. The authors were Håkon Christie and Knud Krogh, but their books did not come out until 2009 and 2011 respectively. There is every reason to discuss these books in more detail as it could be

maintained that in several fields they have raised the standard of Norwegian stave church research. In my survey, I will continue to apply the previously-used perspective: the connection between documentation, analysis and conclusions.

Håkon Christie's book on *Urnes stavkirke* (Urnes stave church) is characterised by a great number of reproductions of survey drawings, from the building itself and down to the last detail, as well as a number of photographs. The research lies in this material. The descriptions that are added simply verbalise what we see.

The building has been surveyed and documented, section by section. Christie writes that he has put the emphasis on "clarifying how the material appears to have been joined together; which surfaces they were given and how they were prepared".²⁰ The analysis of the joint, a highly important construction detail, represents progress in stave church research. In order to understand the construction history of Urnes stave church, it was important to be able to document parts that are normally inaccessible, but that become visible during repair work, such as the base frame. The main aim has been to uncover the building's "anatomy", as Christie puts it which must be understood as the church's design and construction. This analysis of the "construction raises a number of questions of which stave church research has previously taken little notice".²¹ Unfortunately, it is not made clear what these questions actually are. In another context Christie distances himself from a more interpretative account by maintaining that "as long as the stave churches contain such a large amount of information that research has not utilised, a priority will be to investigate and document the stave churches, and present the results in a comprehensive way".²²

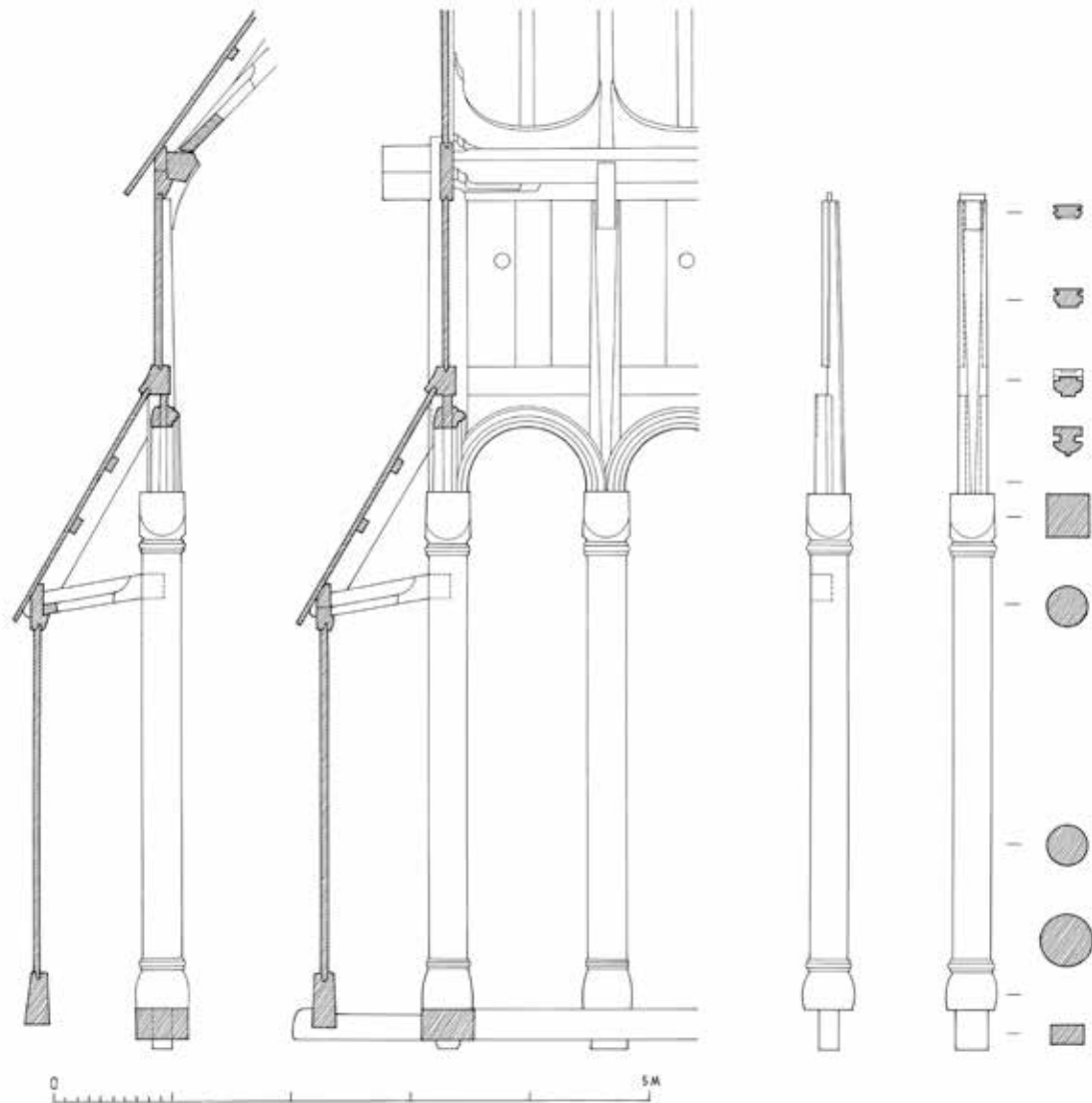
Håkon Christie was an outstanding authority on Norwegian wooden buildings, and particularly their construction. This can be seen in his book, *Middelalderen bygger i tre* (Medieval buildings in wood) (1974). However, in the stave church context he uses this knowledge and insight to only a small extent. The descriptions are almost catalogue-like and are seldom emphasised or explained, so that the reader has difficulty in making use of the great source potential that this book on Urnes represents. Only in a handful of cases does he go beyond the basic registration details and puts individual data into a wider context.

In particular Christie was interested in how it was possible from a purely technical point of view to erect the high, raised centre nave at Urnes, especially because the height is great in relation to the width. Christie is far too close to the source and too objective to emphasise how immensely sophisticated this was. One might speculate on the purpose of such a complicated design, which was open right up to the roof ridge: perhaps it was part of the church's visual message, the heavenly space. Another issue that interested Christie is how the church construction is put together and how the stave church was erected. In this perspective, many small and seemingly unimportant observations have meaning and relevance. One approach is, for example, to study adaptations and adjustments in the joints of the construction elements.

Finally there is a chapter which Christie called "A summary of thematic discussions" where he turns the searchlight onto construction materials, craftsmanship and construction techniques. Here he puts forward a number of exciting observations concerning material quality, surface treatment, profiles, tool marks and use of tools. In this field Christie must be acclaimed for being innovative. Evidently he is also clear about the significance of such documentation data. However he is very brief in his interpretations, and only hints at the opportunities for more fundamental conclusions.

Håkon Christie writes in the summary that the discussions are aimed at "characterising the craftsmanship and the construction techniques mastered by the builders who built Urnes stave church. He further adds that an analysis of "the method of jointing and where in the structure the various joints are used, will be able to tell us something about the stave church builders' insight into statics and the suitability of the timber as a building material".²³ Later, Christie notes that the church's "joints show in many cases traces of how they were made and what types of tools were used. A systematic study of these issues could lead to an increased understanding of the builders' repertoire of craft techniques and technical solutions, contribute to characterising the construction team and provide an insight into the development of the building of the church."²⁴

A subject that has received little attention in stave church research is how the interior of the medieval church was furnished. Christie has been aware of traces and marks from the immovable inventory and has



Documentation as registration: in Håkon Christie's *Urnes stavkirke* (*Urnes stave church*) the building was surveyed and described, part by part. The analysis of the joints, a very important construction detail, represents a step forward in stave church research. The drawing shows, from the left: section of the nw part of the north wall from the west. Centre: elevation of inside of the wall from the south. Right: west intermediate stave of north wall viewed to the north and east with cross-sections.

documented these. Examples are choir screens, altars on each side of the chancel and other side altars, including a so-called *alterstuke*, an altar with a form of superstructure. Hooks for hanging textiles, or tapestries have also been found. These elements probably span a long period of time, but in any case the church interior must have been richly decorated in the Late Middle Ages. This applies not only to the inventory but also

to the use of colour. The altars probably had colourful triptychs and altar frontals. On certain occasions the tapestries must also have added to the colourful interior of the church.

To some extent it should be possible to reconstruct the interior at Urnes stave church from a liturgical aspect. Today, we are fascinated by the constructional details of the interior, which create an intricate, logical

pattern; and by the angle of the light, which creates strong artistic contrast and tensions. For the medieval congregation, the experience of the interior must have been quite different; a richer impression communicating its main purpose: to spread the Christian message.

In order fully to understand the stave churches, it is important not only to consider the architecture and the construction: its function must also be included. These were places for liturgy and rituals, and not least, preaching.

Finally, there are grounds for maintaining that Håkon Christie's *Urnes stavkirke* is clearly very valuable, due to the documented material it contains. However, from a research perspective, the questions that remain and the suggestions for further investigations are very important. I will refer to these below.

Documentation as research: Knud J. Krogh

Knud J. Krogh's work on *Urnesstilens kirke (The Urnes-style church)*, which was published in 2011, represents a landmark in Norwegian stave church research. The author is a Danish architect and archaeologist. His thesis appears to be very traditional, as Urnes stave church has been thoroughly discussed for a long time and many hypotheses have been put forward about the history of the building. For this reason it might be thought that the theme had been exhausted, the data potential used up and the uncertainty too great for more unambiguous and certain results to be presented. Nonetheless, there is reason to describe Krogh's thesis as innovative and future-oriented, as older theories have been laid to rest.

This characteristic does not only cover the sensational results that Krogh arrives at in connection with the building's history, but also the analytical and methodological elements. The thesis satisfies in its entirety the formal academic requirements for research. These aspects will be considered in the following.

Krogh's thesis must be regarded purely as a research publication. It is not the great story, or synthesis, of the Norwegian stave churches, based on an overarching concept, but primary research associated with a single monument. Krogh's presentation is very exciting to follow, step by step, as we can see the research procedure: choice of data, assumptions and conclusions. The arguments are so clear that the reader himself can be a participant and co-researcher. This was also the author's

intention, as he writes in the introduction: only with the help of detail drawings and descriptions it is possible for the reader to "come as close as possible to the many reused materials, so that they themselves can form an idea of how these can be interpreted".²⁵

An important precondition for this view in the research process is the close links between illustrations and text. These support and strengthen the force of the statements, and the detailed drawings are particularly enlightening. The connection between visual data put into written form is easy to follow. This broad, comprehensive presentation of the source data shows that Krogh is a solid empiricist, but it is also worth noting that these are followed up with precise questions and explicit conclusions. The fact that the end is not extended further than sources justify also shows Krogh's scientific robustness.

The aim of the investigation is to place the proven reused material into a uniform context, as part of a building. The purpose is also to look at the hypothetical reconstruction drawings in relation to the remains of buildings found under the floor of the current church. In addition to demonstrating solid, formal qualities in his thesis, Krogh's conclusions build on an in-depth familiarity or insight, acquired over a long period, right from 1969 to the present day. This has created opportunities for invasive analyses of the stave church at Urnes, which have meant that meaningful, but seemingly small and insignificant details, have been uncovered.

Fundamental to the whole investigation is the identification of reused materials. A number of construction elements in the extant church show that they previously had quite another use as they have been truncated for a second time and also adjusted somewhat crudely. A vital key to understanding the church building was the discovery of reused sill frames under the existing church.²⁶ Krogh's analysis of the building has led to research results that cast a critical light on older assumptions and methods. With the help of decorative construction elements, with decoration in the so-called "Urnes-style", which have been reused on the north wall, a gable and minute marks, Krogh succeeds in presenting a persuasive proposal for reconstruction that makes older interpretations of how the construction elements with Urnes ornamentation had been used, less probable. Krogh's reconstruction drawing shows a decorated west façade, designed according to a large-



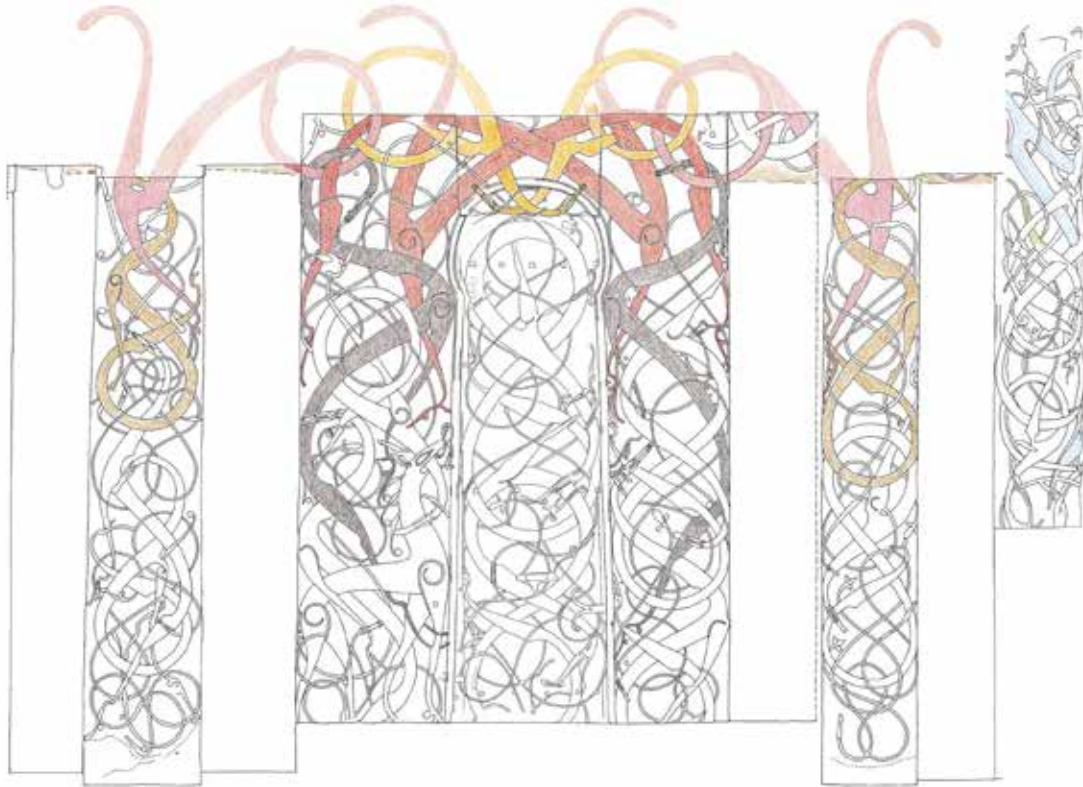
Documentation as research: in Knud Krogh's *Urnesstilens kirke* (*The Urnes-style church*) the church is analysed in depth; small, possibly insignificant details are revealed and made more meaningful. With the help of decorated construction elements, carved in the so-called «Urnes-style», re-used on the north wall, a gable end and minute traces, Krogh succeeds in setting out a convincing reconstruction proposal for the preceding church on the site, which he calls the «Urnes-style church». The drawing, the re-used materials in the extant church are marked in brown.

scale, comprehensive architectural idea. The justification for this interpretation lies in his demonstration of an inner connection between the decorative carvings and construction.²⁷

Krogh's investigations also mean that the construction history of the different churches at Urnes must be completely revised and that older hypotheses must be abandoned. The Urnes-style church had a simple, rectangular form with a conjoined chancel. The fragment of a chancel wall sill that was found shows that these spaces were built as one. Furthermore Krogh demonstrates that the remains of a sill frame were reused as foundations for the current church.²⁸ This implies that

the Urnes-style church also rested on sills and was not supported by posts sunk into the ground. Judging by the reconstructed interior space, it could not have had a raised chancel either. This means that the Urnes-style church cannot be linked to post holes and the remains of constructions that have been found by archaeologists. The consequences of these research results are considerable in relation to previous assumptions.

It can no longer be postulated that there was a continuous set of church buildings at Urnes that demonstrate a developmental dependency on each other. They were all designed according to independent design concepts, which must have come from elsewhere. The research



The Urnes-style church. The drawing shows Krogh's reconstruction of the carved wall plates, the corner stave and the portal's original context.

results that Krogh presents regarding the churches at Urnes invite some general considerations of both a cultural historical nature and a methodological nature.

Without going further into this discussion, Krogh assumes that three churches were erected on the site, in addition to the current church. He assumes that the archaeological traces represent the outline of two churches, and including the Urnes-style church, the extant church has three predecessors. The fact that several churches were built on the same site is not surprising given the medieval theologians' emphasis on altar continuity: new churches should occupy the same place as the main altar of the previous church. What is particularly interesting from a cultural history perspective is the short time between the churches at Urnes in the Middle Ages; less than one hundred years.

In this field, Krogh used a new, scientific tool for dating the Urnes style church, namely dendrochronology.

According to this method the building was erected shortly after 1070.²⁹ This means that the oldest of the post churches can originate from the end of the 900s. It is quite remarkable that the Urnes-style church had been demolished by 1130, according to the dendrochronological analyses. This can hardly be due to rot or decay as the materials and standard of craftsmanship must have been of a very high quality. The reason must be that a completely new design was launched, a church building with a raised ceiling above both the nave and the chancel. We can only speculate about the model and the starting point for this and it is not easy to find solid, supporting reasons either; perhaps it was for a theological reason, a new interpretation of the church interior, or status and prestige. Roar Hauglid argues that the model was the Romanesque stone church.

It is also very interesting that Krogh puts the use of recycled materials and new church designs into a larger



Krogh's reconstruction of the preceding church at Urnes based on the preserved reused materials and traces in these. Non-documented parts are shown without an outline.

context and finds examples of the same reuse of materials and changes in church design in other parts of the country. This shows that the change in church design is part of a more general process and must have had a significant and profound background factor. Explaining this context is typically a multi-disciplinary task.

Knud Krogh's *Urnesstilens kirke* (*The Urnes-style church*) is discussed thoroughly here, not only because it is a model of solid academic work but also because it points the way for future stave church research.

An important point is the significance of buildings analysis through documentation and research. This is not in itself anything new, nor are observations of details, as Håkon Christie documents in his book. Krogh, however, goes a step further in his analyses and tries to use the

inherent significance of the details to a much greater extent than has been the practice previously. For him they represent an indicative value and in this regard they can provide significant information. For example he considers the sill under the choir screen wall, which is gently hollowed out underneath. This means that the sill can only have rested on its sharp outer edges.³⁰ This is technically very challenging, especially as the work was done using an axe which demonstrates a high level of craftsmanship. However a technically demanding feature must have a purpose, an aim. A similar sill and technique is used to connect chancel and nave in the present church. In Krogh's view this continuity of solution for connecting chancel and nave in both the former and the present church contradicts the evolutionary view

of the chancel as a newer type of construction added to an old central type building. Small details can provide answers to big questions.

A platform for future stave church research

Some recent comments, more specifically from 2015, indicate that there is a degree of worry about the activity level in current Norwegian stave church research. Hence there is reason to look at some of the comments that point in this direction. The head of the Directorate of Cultural Heritage's stave church programme, Sjur Mehlum, told the media that "it has been something of a surprise to me that interest in the stave churches is much greater from abroad than from Norway".³¹ A major stave church researcher, Leif Anker, maintains that work in this area has come to a halt, and says the opinion that "the stave churches have been well and truly chewed over, is highly superficial. There is no comprehensive survey of all the churches".³² The most experienced researcher in stave church research, Knud Krogh, is very clear in his opinion. This is demonstrated by a comment at the Society for the Preservation of Norwegian Ancient Monuments' seminar at Urnes in 2015: "... The task we face is to train people who can help to maintain and investigate the stave churches in a responsible way".³³

In spite of these somewhat pessimistic descriptions, there is reason to hope that the Directorate of Cultural Heritage's completed stave church programme represents a change for the better. At the end of the project this year, it is clear that the project has brought to light much new knowledge and that awareness of the stave churches has increased. However, in order to utilise this knowledge capital and insight, it is necessary to develop a research strategy and to look closely at the training situation.

The sustainability of such a measure from a scientific point of view depends on identifying the restraining factors that prevent a positive development. Here we are leaving aside the financial challenges.

The stave churches represent some of our national icons and you do not interfere with symbols. This attitude can act as a deterrent to research. The fact that many cultural history disciplines at the universities today are less interested in symbols of nationalism, and

tend to put the emphasis on subjects from a global perspective, is another deterrent. The fact that stave church research is seen as traditional, focused on the same themes for a long time, is also off-putting. It does not tempt young researchers, as the majority want to belong to a dynamic research environment.

This type of standstill in stave church research may be a symptom of a lack of ability to problematise the well-known, or critically to verify established research results. One inspiration for this kind of problem is the research history, which provides both a thematic and methodological status. The standstill could be counteracted in many ways. The above overview of Norwegian research (see Leif Anker's chapter 7) can serve as both inspirational and corrective material. Obviously new source data are both important and necessary, but there is also a vast potential in the choice of non-traditional perspectives. Some examples will be highlighted here.

One very positive idea would be to set stave church research in an international context, to a much greater extent than previously, for example when investigating the earliest wooden churches in Europe, and not least discussing wood as a building material in the Middle Ages on a fundamental level.

The stave churches' status as important national icons is in itself an interesting research. This touches on a problem I have not yet looked at, but which is no less important: the status of the stave churches as historic monuments, the process of 'musealisation' and, in more recent times their function as important tourist attractions. The stave churches, in connection with the growth of Norwegian cultural heritage protection, have been the subject of some research, especially on the institutional side.³⁴ One might hope that in the future that there will be greater analytic depth in the thinking and values behind the preservation of the stave churches, and not least a discussion of the dilemmas faced in this work. One of the few works that has really considered this theme is Sjur Mehlum's dissertation on *Autentisitetskriteriet og Kaupanger stavkirke (The criteria of authenticity and Kaupanger stave church)*. Here he assesses the restoration of the church based on qualities of authenticity and source value.³⁵

Even though some of the stave churches must today be regarded as a type of museum, many of them retain a church function, and some are parish churches. This means that they have resisted fundamental changes due

to changing theological perceptions of the church interior and the liturgy.³⁶ Obviously, adaptations have been made, but the continuity from the Middle Ages to the present day is the most noticeable feature in the majority of stave churches. Some have also retained some of their medieval inventory, such as Hedalen stave church.

This provides an outstanding opportunity to study the relationship between the church interior, theology, liturgy and social conditions. The continuity of the church's interior over a long period of time, and a strong adherence to tradition are interesting cultural analytical questions, and raise the question about why people held on so doggedly to the old, such as the stave churches.

One challenge is that stave church research is undoubtedly a multi-disciplinary subject, involving not only architectural, cultural and church history, but where other disciplines are important such as theology and the history of the liturgy, and general history where economic factors play an important role. This multi-disciplinary nature can be developed into a cross-disciplinary subject. This does not mean running parallel streams of research, but that the different disciplines meet. The different disciplines must be given the opportunity to work with their own subject tradition and expertise, but also to work with the other subjects in an active way, where creativity is achieved through mutual information, questioning and resistance. Such a meeting in the interface between different disciplines requires good organisation and leadership and this is not easy to achieve. Another argument for stave church research becoming more inter-disciplinary is the teaching situation at the universities. Today the traditional subjects are divided into modules. Where there is subject specialisation, more in-depth knowledge of a given area can be achieved, but there are also disadvantages. It is easy to lose broad expertise and the general perspective of a large field of research. This is necessary in order for cultural history to contextualise the stave churches in a responsible manner.

One characteristic of stave church research is that it has strong institutional links to the Directorate of Cultural Heritage and NIKU (the Norwegian Institute for Cultural Heritage Research). An important background factor in the Directorate of Cultural Heritage's involvement in this matter is the maintenance of the stave churches, which should be done as authentically

as possible. This requires that both the conservationist and the craftsman have a good understanding of the construction rationality behind the structures. However, such a situation-specific, instrumental research activity can also have its drawbacks. It can become fragmented and unsystematic, based on academic requirements, becoming something that Terje Planke describes as "research driven by decay". There can be a danger that an overly-strong institutional interest dependency makes stave church research narrower, and it is difficult to get beyond the problems involved in preservation work.

We must not underestimate the power of positive developments in stave church research. One field that is highlighted is the closer cooperation between conservationist and craftsman which has developed as a result of the Stave Church Preservation Programme.

Craftsmanship as both practice and research

The craftsman's "short-sightedness" and practical experience means that practitioners can look at details that represent vital sources of knowledge and also open the door to previously unknown sides of a building. The beginnings of such a focus can be seen in Christie's and Krogh's documentation work. However, it is possible to penetrate deeper into this field. Here I refer to Terje Planke's chapter in this book.

One task would be to document the traditional craftsmanship which is normally carried out in stave churches today as *concrete* practice. This builds on the so-called "tacit knowledge" or practical knowledge, on different types of motor- and sensory experiences which are seldom expressed in words.³⁷ This is a demanding form of documentation and requires a very good dialogue and empathy between the craftsman and the person carrying out the documentation. One example that can be highlighted is the use of tools in the stave churches. This involved a handful of technically simple tools which have given impressive results from a quality perspective. The tools are not particularly specialised, are widely applied and are characterised by the fact that knowledge and methods are built into the manual work and traditional, learned assessments.³⁸ This type of investigation has great transfer value, as it concerns an understanding of wood on a general basis and a specific technical rationality.

On several occasions I have highlighted the importance of looking at the stave churches as a holistic construction, something which earlier stave researcher have only hinted at. The first person systematically to apply a holistic perspective was Jørgen Jensenius in his thesis from 2001: *Trekirkene før stavkirken: en undersøkelse av planlegging og design av kirker før ca. år 1100 (Wooden churches before the stave churches: a study of the planning and design of churches prior to around 1100)*. Further on in the arguments surrounding a holistic understanding of the stave churches, we can draw on Terje Planke's concept of patterns. This is clearly theoretically based, but also practically tested through the maintenance work on the Rolstad barn from the 1300s which now stands in the Norwegian Folk Museum. Analysing a pattern in a building involves "finding out how the object's different elements are connected through use of material, design, structure and strength. This also adheres closely to the craftsmen's ways of working and ways of thinking".³⁹ There is reason to expect that such an analytical perspective could provide new knowledge and deeper insights into the stave churches as structures. One conclusion we can draw from Planke's investigation is the significance of the roof construction for the strength of the building as a whole. With regard to the stave churches, the roof construction has not previously been considered as a vital and integrated part of the building to any great extent. Partly due to Ola Storsletten's thesis from 2002, *Takene taler. Norske takstoler 1100–1350 (The roofs speak. Norwegian roofs 1100–1350)*, we now have good reference material.

As noted previously, some of the stave church researchers have documented traces of immoveable inventory. These can, if treated as a whole, provide an impression of the stave church as a liturgical space. In this field, technical conservationists have recently come up with new and important knowledge which needs to be put in a more systematic framework that has been done previously. The analysis of pigments, painting techniques and reconstructions of colour composition with regard to the stave church inventory are obviously important from an art-history perspective, but such results are also very interesting to other disciplines as well. In the Middle Ages, the interior of the church must have been extremely rich in colour and would have provided a particular effect to the overall experience. This is in contrast to several of the current stave church interiors,

such as Gol and Borgund, which no longer have any inventory so that they stand empty, and we are left only with the actual construction.

Many cultural analysis-oriented subjects attempt today to override the divide between the material objects, ideas and mentality. This assumes an interpretive and empathetic view. A connection between theology, preaching and the building can be a relevant perspective for understanding the stave churches. Another view is to attempt to see the church interior from the layman's perspective.

An important starting point for this kind of understanding of the interior of the stave church is the so-called "Stavkirkeprekenen" (the "stave church sermon") which dates from the 1100s. The sermon uses the different elements of the building and a general stave church type metaphorically, as illustrations for the sermon. The archaeologist Frans-Arne Stylegar sees the sermon's structure as a form of recollection technique to emphasise the sermon, and which refers back to an Old Norse, oral, cultural tradition.⁴⁰ The theologian Inge Sørheim goes even further back in his interpretation of the stave church sermon. The reference to the different construction elements in the church is more than just an aide-memoire; it represents an aid to meditation; an aid to thinking, a way of concretising inner images. These conclusions build on a general knowledge of the spirituality of the church of the Middle Ages.⁴¹

A conclusion

Stave church research has been concerned with origin, development and chronology. This has been an ongoing theme. Many of the stave church datings must be characterised as hypothetical, as they build to a greater or lesser extent on what Leif Anker characterises as the straightjacket of typology, a method of dating that takes its starting point in a schematic thought development and not in historical reality. Through modern scientific dating methods, such as dendrochronology and Carbon 14 dating, the dating of stave churches will become much less uncertain than before, and these methods will continue to be improved upon and become more reliable. This means that this type of dating should not be used in isolation. The more data that support the dating, the greater the chance that the dating will be credible.

There is reason to think that a broader and better dating basis for the stave churches than has been the case until now, will open the way for new discussions. Once more exact dating methods, supplemented by new data, come face to face with older, postulated development trends, chronology and regional variations; the research situation is likely to become more complex and difficult to disentangle. However, this is nonetheless a progress factor. The straitjackets of typology and dating issues will be avoided. This means that there will be more freedom than before to investigate the stave churches' cultural hyper-complex character. In this way the stave churches will, through a number of different perspectives, be better explained than has been the case to date.

Finally there is reason to supplement my survey of the Norwegian stave church research with a view from outside. The aim has been to suggest a research policy goal and strategy. The different disciplines that are implied, both academic and practical, need to work together to synthesize and describe complex connections that stretch over a long period of time. Only then will we acquire a comprehensive understanding of our stave churches and their research potential. Based on this view, I have also indicated some areas for further research. However I have also tried to warn against too much traditional specialisation and theoretical fundamentalism.

9. WORK UNDERTAKEN IN THE STAVE CHURCH PRESERVATION PROGRAMME

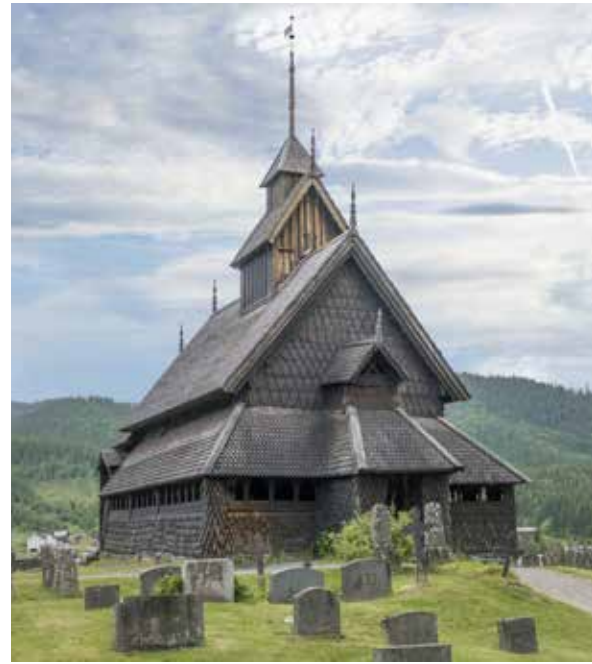
LARS DANIELSEN HOLEN

The following chapter contains a short presentation of each of the 28 stave churches in Norway, with a summary of the most important periods of the church's history. There is a short description of the main work undertaken on each individual church during the Stave Church Preservation Programme. Both the repairs on the church and the conservation of the church art are listed. The intention is not to present a full overview of the works undertaken, for this; detailed reports for each church are available in the archives of the Directorate for Cultural Heritage.



Borgund stave church, Lærdal

Borgund stave church is one of the best preserved stave churches. It is dated to ca. 1180. Under the Stave Church Preservation Programme, about 5,800 shingles were replaced on the stave church. In contrast with the work on many of the other stave churches, a decision was made to check each individual shingle and only replace them where absolutely necessary. The work revealed leaks and rot in the gutters and the sills, but not to a degree requiring action. The rafters were improved and new copper fittings were mounted on all the gutters. The work at Borgund was carried out in the period 2006–2012. This provided an opportunity to study the ridge turret of the church and make and mount new copies of the characteristic dragon heads, which were actually also copies, made in the 1700s. The triptych in the church is from the early 1600s and was treated by a conservator. The status of the ground beneath the floor was registered. The free-standing bell tower at Borgund stave church is the only one left from the Middle Ages. The support structure of the bell tower was severely damaged by rot. The Stave Church Preservation Programme ensured that the rotten parts of the construction were filled in where this was sufficient, and elements were replaced where necessary. The panelling of the bell tower was copied and secured with wooden pegs.



Eidsborg stave church, Tokke

Eidsborg stave church can be dated to after 1250. The roof, posts and walls are characteristic of the church, as they are all shingled. Eidsborg stave church is a long church, originally with a narrower chancel. Numerous structural changes have been made to the church. Interior walls were decorated in 1604 and in the 1640s, and the ridge turret was built in the 18th century. The chancel has been lengthened twice and in 1845 it was rebuilt with cog-jointed logs. When the Stave Church Preservation Programme started, the original medieval roof construction was found to be severely damaged. A new supporting roof construction was built above the original one to preserve it. The initiative was one of the most comprehensive projects in the entire Stave Church Preservation Programme. The roof was re-shingled with hewn shingles. The eastern gable had a unique exterior which imitated the shingling on the church. This was rotten and damaged. So a permanent replacement wall, a copy of the original, was built to protect against further deterioration. Work was done on the stone stairs outside the church. The church art was also restored. In 2007 the painted wall from the 1600s and the panel from the Middle Ages were conserved.



PHOTO: BIRGER LINDSTAD 1996

Flesberg stave church, Flesberg

Flesberg stave church is dated to the latter half of the 1100s. In the Middle Ages the church had a rectangular nave and a narrower chancel. Its current form dates from 1735 when the stave-built nave was torn down and rebuilt in a cruciform shape, with new parts made of cog-jointed logs. Sections of the original stave construction now comprise the western part of the nave. Much of the church's structural damage was in the cog-jointed part, which was badly affected by rot. The rotten logs of the southern wall were replaced. Rot in the wall above the southern transept was dealt with and the roof construction was renovated. The work was done in the period 2004–2005. In the stave church portion of the building, layers of paint were removed to reveal the old distemper painting.



PHOTO: JIN HAWANA UNDATED

Garmo stave church, Lillehammer

Garmo stave church was originally located at Garmo in Lom, but now stands in Maihaugen open-air museum in Lillehammer. It was one of the last stave churches to be demolished, as late as 1882. In 1921 the church was reconstructed. Through the Stave Church Preservation Programme the church was given new roof shingles and was re-tarred. When the work was being done the two characteristic dragon heads of the roof were replaced by new copies and the church was given new ridge crests like the old ones. The interior furnishings of the church were inspected by a conservator and minor improvements were made, including the restoration of the chancel screen. Work on the church was done in the period 2005–2009.



PHOTO: DAGFINN RASCHUSSEN, 2015

Gol stave church, Oslo

Gol stave church is originally from Gol in Hallingdal but it was moved to the Norwegian Museum of Cultural History at Bygdøy in Oslo in 1884. The church is dated to the beginning of the 1200s but it may have older parts. The church has looked as it does now as far back as the 1600s, with a pentice around its nave and chancel. The ridge turret was renewed in 1694 when a ceiling was built over the nave. Sometime later the chancel and apse were demolished and a new cog-jointed log chancel was erected. The old material was re-used in the ceiling of the new chancel and this is how the wall paintings survived, which were later restored in connection with the move. The medieval parts of the church were registered during the Stave Church Preservation Programme. The church was given new roof shingles and the crosses and dragon heads on the church were replaced with copies. A replica of the original monogram of King Oscar II has been mounted on the west gable of the church. The condition of the art and furniture in the church was registered. The work on the church was done in the winter of 2012.



PHOTO: JIRI HAVRAN, UNDATED

Grip stave church, Kristiansund

The stave church on the island of Grip is a small church with an original core from the Middle Ages. In 1621 the walls of the chancel were replaced and richly decorated. In the 1870s new windows were mounted and the outer and inner walls were panelled and painted. In 1933 the church was extensively restored and we believe it now looks as it did in the 1600s. During the Stave Church Preservation Programme the church was given new slates on its roof and the spire was repaired and re-roofed. The western wall of the church was given new panelling. Panelling was made using thicker boards to reduce any fire hazard. In 2006 the church was measured and work was done to improve ventilation beneath the floor. The decorative interior painting in the church was restored in connection with the Stave Church Preservation Programme in the period 2001–2006. The distemper painting décor in the nave was cleaned and consolidated. The medieval triptych was also conserved.



PHOTO: DINO MAKRIDIS 2016

Haltdalen stave church, Trondheim

Haltdalen stave church was demolished and moved via Kalvskinnnet to Sverresborg, where it was re-erected at the Trøndelag Folk Museum in 1937. At this time, it was given a new west wall and portal. The church is small and consists of a rectangular nave in the east and a lower rectangular chancel in the west, constructed from parts from Haltdalen stave church and the western portal from Ålen, which is dated to ca. 1160. Restoration work was done on the church in the 1970s. In 2015 the church was given a new stone wall foundation and the chancel was straightened. Damage from rot was repaired, including the replacement of wall planks on the west. A decision was also made to replace the portal from Ålen stave church with a copy in 2016. The church has been given new shingles and the roof surfaces on the nave were given overlapping boards, a type of roofing that the church had originally. A discovery was made at this time; the nave's southern roof surface appears to have its original boards intact. In connection with the Stave Church Preservation Programme a course was held on the production of roofing material.



PHOTO: BIRGER LINDSTAD 1998

Hedalen stave church, Sør-Aurdal

Hedalen is dated to after 1160. It was rebuilt as a cruciform church in the late 1600s. In 1902 the church was restored with a new chancel, where the altar is placed today. The church contained art which is considered to be amongst the most beautiful Norwegian works of art from the Middle Ages. Of significance are its dragon portal, crucifix, the Hedalen Madonna (a statue of the Virgin Mary) and unique wrought ironwork on its western door. The bell tower of the church was renovated by filling in where wood had rotten, and repairs to the roof were made. The foundation wall beneath the church was improved and the porch on the north side was jacked up in place against the north wall. The supporting stone wall around the churchyard was improved as well. Maintenance was done on the slate roof and the gutters of the church, and it was also re-tarred in the period 2009–2011. The Hedalen Madonna was returned to the church after 20 years in Oslo. The medieval crucifix and triptych have been restored.



PHOTO: MILODZIMIRZ WINTER 2010

Heddal stave church, Notodden

Heddal stave church was probably built in the 1200s. The church has a raised chancel and nave and is the largest surviving stave church in Norway. The church was extensively restored in the period 1849–1851. In the 1950s Heddal was reconstructed to return it to its presumed medieval design. The church has four outstanding preserved stave church portals. In connection with the Stave Church Preservation Programme, the bell tower of the church was restored and the gates in the churchyard wall were re-shingled. The flagstones in the pentice were re-laid in 2013. The interior is distinctly influenced by the period following the Lutheran Reformation in 1536–37, and by later restorations. The decorative distemper paintings were cleaned and consolidated in the period 2008–2010. Analyses of the distemper décor were made using new methods to document the extent of the surviving medieval decorations.



PHOTO: ENNAR KARSLEN 2012

Hegge stave church, Øystre Slidre

Hegge stave church is dated to the early 1200s. It is a so-called interior post church with a rectangular floor plan. The church was rebuilt and has little original material left from the Middle Ages. A foundation was cast beneath the staves when it was repaired in 1924. It was given a new floor, and during the renovation work the church's walls and staves were painted and new pews were installed. Groundwater seepage had caused severe damage and rot in the wooden structures and the church floor of Hegge stave church over a lengthy period. Drainage improvements were implemented in connection with the Stave Church Preservation Programme to divert and limit the flow of water. Rotten floor beams were replaced and air ventilation in the foundation was enhanced by excavating some of the underlying terrain. The digging was supervised by an archaeologist and intriguing finds were made, including several graves. A cog-jointed bell tower at Hegge stave church was repaired by replacing the rotten timber. The church art was assessed and found to be in good condition. The work on the church was done in the period 2004–2005.



Hopperstad stave church, Vik

Hopperstad stave church is dated to the 1130s. The church remained fairly unaltered until the 1700s, when the nave was extended to the west and a bell tower was erected above the new section. Due to this renovation, very little of the medieval exterior has been preserved. All four medieval portals are distinctive elements of Norwegian building history. In the 1880s the church was given its present appearance after being restored by the architect and engineer Peter Blix. Under the auspices of the Stave Church Preservation Programme restoration work was done on the portals leading into the pentices. Additional improvements were made to the roof in 2007 and 2008 when a total of 19,000 shingles were replaced. The new shingles were of excellent quality, of pine heartwood cut in the same way as shingles from its restoration in the 19th century. Gutters and fittings were also upgraded and the church was re-tarred. An examination of the wall decoration in the nave and chancel of Hopperstad stave church showed this to be in poor condition and in need of conservation. In addition to the art, two funeral shields and a memorial plaque were conserved.



Høyjord stave church, Andebu

Høyjord stave church is the only stave church in Vestfold county and also the southernmost in Norway to have survived since the Middle Ages. The church was originally of the centre post type. The centre post and a ridge turret were, for reasons that are unclear, reconstructed in connection with restoration work implemented in the period 1948–1953. The chancel is thought to have been built in the last half of the 12th century, but the nave is from ca. 1275. The church also had pentices until 1689. The church has 12 load-bearing staves in addition to the centre post. In 2014, in connection with the Stave Church Preservation Programme, the building was fitted with new shingles and extensive roofing work was carried out. A replica of the church's unique weather vane from the 1200s was constructed, covered with gold leaf and mounted. Measurements have been made of the medieval parts of the church, and a condition assessment was made of its art and furnishings.



PHOTO: MARCIN KALINSKI 2011

Høre stave church, Vang

Høre stave church is dated to ca. 1180. The stave church is an interior post church with a rectangular nave and a narrower chancel. It has some of the most renowned Norwegian stave church portals. These are richly decorated with carved leaf motifs and animal ornamentation. An older roof turret was taken down earlier and re-used as a lych-gate, a gateway to the churchyard. The church is characterised by the extensive renovations made in the 1800s. Much of the southern side of the dry-stone foundation was rebuilt. Fungus was discovered beneath the floor in supporting structures and these were replaced. The slate roof was cleaned and damaged stones replaced. New gutters were added and the cog-jointed log bell tower from the 1600s was repaired. Damage was found on the east side of the bell tower, but this is sheltered by the roof and repairs were deemed unnecessary. The work on the church was conducted in the period 2005–2007. The condition of the church art was registered and found good.

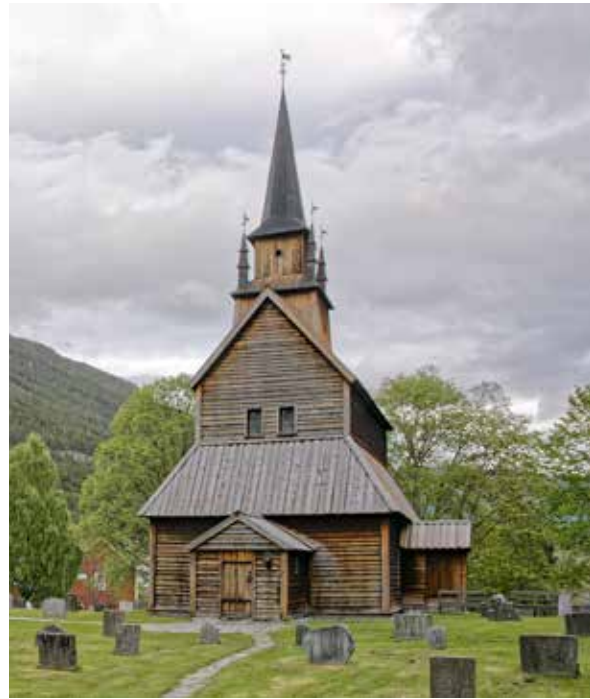


PHOTO: DAGFINN RASVUSSEN 2015

Kaupanger stave church, Sogndal

Kaupanger stave church has an elevated interior post construction in the nave and chancel. The church is dated to ca. 1140. The church has been rebuilt many times and is the longest of the stave churches, as it was extended toward the west in the Middle Ages. The present design of the church is a result of restorations done in the early 1960s. The church was then given new exterior panelling and a new roof. There was no need to repair it under the Stave Church Preservation Programme. Work has been done on the churchyard walls and the churchyard gate. Extensive work was done on the church art at Kaupanger in 2008 and 2009. The triptych, pulpit, baptismal font and two of the epitaphs, all dated to the 1600s, were treated. The distemper decoration in the chancel and nave was restored as well.



PHOTO: JIRI HAVRAN UNDATED

Kvernes stave church, Averøy

Kvernes stave church may be one of the country's youngest, dated to ca. 1300. The church is of the so-called 'Møre type' with its characteristic construction. The nave and chancel are both from the original church. The chancel is cog-jointed at the same width as the nave. Kvernes is particularly exposed to weather. As a result, in 2015 under the Stave Church Preservation Programme, several smaller portions of the outer panelling were replaced and spliced. The church's outer supporting struts were repaired and new lead fittings were mounted on the ridge turrets and gutters. Damaged roof tiles were replaced. The interior furnishing of the church were treated in the period 2011–2013. The walls in the nave and the baptistery, a royal monogram on the chancel screen and the door on the south side of the chancel were consolidated and repaired. The triptych from the late Middle Ages and an epitaph from 1671 were conserved.



PHOTO: JIRI HAVRAN UNDATED

Lom stave church, Lom

Lom stave church is dated to ca. 1160 and is one of the largest stave churches in Norway. The nave has detached staves round an elevated interior post structure with a pentice on all four sides. The stave church has a narrower chancel which is also elevated. Major changes were made to the church in the 17th century. In 1634 the church was expanded to the west with a notched log addition with a gallery. More room was needed in 1664, so a framework transept was added to both long sides of the church and a sacristy was placed on the north side of the chancel. Under the auspices of the Stave Church Preservation Programme, the churchyard lych-gate was restored and the churchyard wall was repaired with new shingling. Shingles on the church were also replaced and gutters and drainpipes were repaired. The church was re-tarred. Major conservation was carried out on the art in Lom stave church in 2009. Work was done on the corpus of the triptych and the chancel screen and the altarpiece and two coat-of-arms were taken out of the church for restoration in conservation studios.



PHOTO: MARTE ESONO 2015

Lomen stave church, Vestre Slidre

Lomen stave church is dated to the end of the 12th century and was rebuilt in 1749 to look as it does today. The church is perched on a hill and had suffered sinkage and destabilisation. This has also occurred earlier in its history and the church was straightened in both the 1600s and 1800s. In the course of the Stave Church Preservation Programme the southern long wall was jacked up. In this connection, a stave was repaired, several parts of the dry-stone foundation were repaired and improved. Loose soil was removed from beneath the church, a job which was supervised by an archaeologist. Fungal rot was discovered in one of the staves beneath the floor and had to be repaired. The slate roof and the windows were examined and repaired. In the bell tower, from 1771, rotten timber was replaced or filled in and the slate roof was renovated. A large tree in the churchyard growing right in front of the entrance to the porch was felled. The dry-stone graveyard walls were repaired. The work continued from 2004 to 2007. The condition of the church art was registered and a canvas painting from the 1600s was restored.



PHOTO: JIRI HAVAN, UNDATED

Nore stave church, Nore and Uvdal

Nore stave church is dated to ca. 1170. The church is of the centre post type. The church has been expanded and rebuilt multiple times. A new chancel was built in 1683 and the first transepts were replaced in the beginning of the 18th century. As early as the 1700s, several walls of the church were clad with vertical wood panelling and it was given a new roof turret 1730. The interior is dominated by the post-Reformation furnishings from the renovation in the 1600s and 1700s. The decorative paintings in the church are also from this period. Nora stave church was in the poorest condition of all the Numedal churches. Improvements have been made to the load-bearing structures of the church, in the nave, transepts, and the bell tower. However, damaged portions have been retained in several sections of the structure, in keeping with a wish to keep changes to a minimum. New shingles have been added to several of the roof surfaces. The re-shingling work was implemented in two periods, first in connection with the work in 2002–2006, then in 2015. Rotten logs have also been replaced in the sacristy. The interior panelling was dismantled in this connection. Conservation work was carried out on the distemper painting in several parts of the church in 2004 and 2005.



Reinli stave church, Sør-Aurdal

Reinli stave church is dated to the early 14th century. Traces have been found of earlier churches on the site, as is the case with many other churches. Reinli is the one of the stave churches built with a nave and chancel of equal width, a so-called long church, and one of the best preserved. It has six portals, three in the portico and three in the church itself. The church was repaired in the Stave Church Preservation Programme from 2007 to 2009. Major improvements were made to the roof, which was damaged by rot. The damaged slates were replaced and the rot damage was repaired. The churchyard wall had collapsed. Stones were taken down and re-stacked to straighten the wall. The foundation beneath the church was also repaired. The bell tower, which is a combination of staves and cog-jointed timbers, was restored after severe rot was detected. In 2007 the church art was restored. The triptych and the pulpit were consolidated and the antependium in the stave church was repaired by a textile conservator.



Ringebu stave church, Ringebu

Ringebu stave church is one of the largest stave churches in the country. The church is dated to the beginning of the 1200s and has been in use continuously. The church was originally cruciform but in the 1630s it was extended with new transepts, a chancel and a new bell tower. In the course of the Stave Church Preservation Programme, the church was given new shingles and re-tarred. The southern churchyard wall was repaired and one stave was given a new foundation. Two medieval crucifixes were treated at the start of the preservation programme. One of them was returned to its medieval state, looking as it did before being painted over in the 18th century. Extensive work was done on the church interior, including the consolidation and repainting of the decorative distemper painting in the chancel. The work on the church was carried out in the period 2010–2015.



PHOTO: BIRGER LINDSTAD 1996

Rollag stave church, Rollag

Rollag stave church was first mentioned in written sources in 1425, but on the basis of historical style it probably dates to the 13th century. In 1670, the stave church's chancel was replaced by a larger one made with cog-jointed logs. Transepts of stave construction were later added and additional alterations in 1760 gave the church its current form. Work on the church was carried out in the period 2003–2006. It was severely damaged by rot in parts above the southern transept. Drainage work was done on the north side of the church to lead water away from the building. Rot was also detected in the lower parts of the northern and southern transepts. This rotten wood has been replaced. In the sacristy, parts of the logs had been replaced earlier but new rot damage had occurred since the previous repairs in the 1930s. Damaged logs were filled in without removing inner panels. Large parts of the tiled roof and the gutters have been fixed. The church art has been restored. Among other things, a medieval crucifix, two epitaphs and a part of a gable from the 1600s have been conserved. One of the epitaphs proved to be painted on both sides. The painting on the reverse side had probably not been seen for over 240 years.

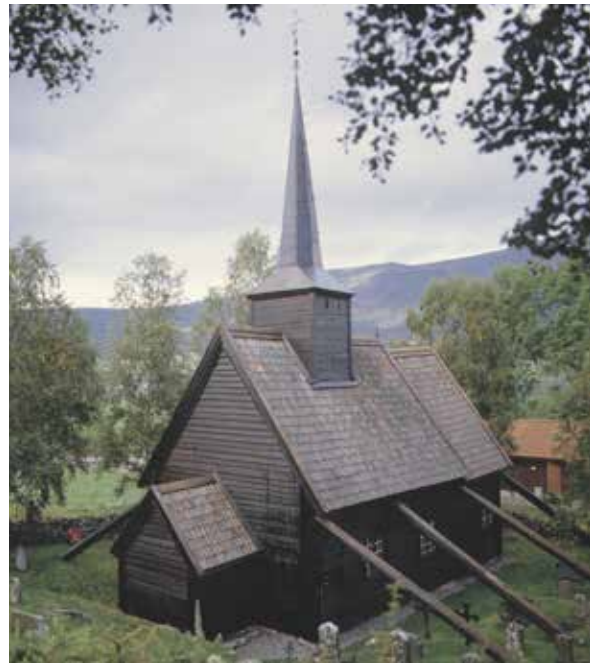


PHOTO: ANNE KJERSHEIM

Rødven stave church, Rauma

Rødven stave church has an uncertain dating in its present form, but remnants of the southern portal are dated to the 12th century. The church is of the so-called “Møre type”. It was built in several phases but the construction history is not fully understood. The original chancel and pentices were demolished in the 1600s and a notched log chancel was built later. Special features of the interior are the furnishings and the decorative painting from the 17th and 18th centuries which have seen little change. Structural damage was mainly restricted to the tower, which was taken down so that improvements could be made. Rot has also been detected in the original stave constructions but this has not been fully repaired, as it was sufficient to replace the most damaged parts. The connecting parts of the wall structures were had rotted away, so new steel ties were attached behind the exterior panel. The roof was strengthened. Work on the church was implemented in 2003–2005. The condition of the art and inventory in the church was registered and they were treated according to need.



PHOTO: RASGÅVA UTINE 1973

Røldal stave church, Odde

Røldal stave church is dated to the 1200s. The church was originally built with a chancel and nave of equal widths. In the 1600s the nave was given a new ceiling and the church had new furnishings. In 1844 the nave was extended to the west and made higher with a new ceiling. At that time the walls were clad with boards inside and out and the church was given a smaller chancel. The current appearance of the church interior is the result of extensive rebuilding and restoration in the period 1915–1918. A number of lesser improvements were made in 2015 in connection with the Stave Church Preservation Programme. Damaged panel boards were replaced, and damaged slates on the roof were replaced and new zinc fittings were mounted. The foundation wall of the church on the north side was repaired and the condition of the church art was registered.



PHOTO: DAGFINN RASVUSSEN 2015

Torpo stave church, Ål

Torpo stave church is dated to the latter half of the 1100s. Only the nave of the original stave church survives, after the chancel and apse were demolished in 1880. The roof was originally wood-shingled but in the 1800s it was given a slate roof. The church interior has a baldachin with a representation of Christ and a hagiography. The ceiling decoration in distemper paint was consolidated in the period 2007–2009. The stave church has been found to be otherwise in good condition. Minor improvements and restoration work were carried out under the auspices of the Stave Church Preservation Programme.



PHOTO: LEIF ANKER 2014

Undredal stave church, Aurland

Undredal stave church is the smallest of the stave churches still in use. The church dates to the latter half of the 1100s. A characteristic of the church is the original decorative distemper painting on the walls from the 1600s and the staves have bell-shaped pedestals. In 2012 the church was elevated by about 30 centimetres and a new foundation wall was added to prevent water damage. Work on the church provided an opportunity to study the exterior of the walls in the stave-built nave, which have not been examined since the mid-1800s. In connection with the Stave Church Preservation Programme the connections between sills and corner staves were studied, along with construction elements which had not previously been documented and investigated. In 2013, the pulpit and the distemper paintings on the ceiling and walls were treated.



PHOTO: ANNE KJERSHEIM 1993

Urnes stave church, Luster

Urnes stave church is dated to shortly after 1130 and is the only stave church listed by UNESCO as a World Heritage Site. Churches have stood at this spot since the 11th century. The church is of the so-called interior post type with a nave elevated in relation to the pentices. Stability was a major problem at Urnes because the foundations had deteriorated. This had led to a critical situation for the north wall, putting a load on the wall planks. In the Stave Church Preservation Programme the north side of the church was jacked up and new foundations were provided beneath all the structural supports. The ridge turret was straightened after the church was raised. At the beginning of the preservation programme the calvary group in the church was taken apart and consolidated. Later the entire church was emptied of furnishings and the floor was removed. In connection with this work, the condition of the ornamental distemper decoration in the chancel was assessed and in places this was cleaned and consolidated. The remaining church art was also assessed and treated where this was deemed necessary. The work at Urnes was conducted in the period 2007–2011.



PHOTO: JIRI HAVRAN, UNDATED

Uvdal stave church, Nore and Uvdal

Uvdal stave church is dated to 1170 and is of the centre post type. The church has been renovated many times and was made given its cruciform shape with a ridge turret around 1725. The transepts are also built in a stave construction. The portals, half-masks next to the chancel opening and the woodcarvings in the western gallery are from the Middle Ages. The painted Renaissance decor is from the 1600s, whereas the Rococo decor is from the 1700s. Severe damage was found in several of the roof surfaces of Uvdal stave church. Roof surfaces that were particularly damaged due to exposure to harsh weather were re-shingled. The shingles on the spire have also been replaced. The shingles were hewn by axe from thick, straight-growing heartwood pine. The shingling was carried out in two periods, first in 2003–2005 and then in 2014. The condition of the church art has been registered and categorised as being good.



PHOTO: JIRI HAVRAN, UNDATED

Øye stave church, Vang

Øye stave church can be dated to ca. 1200. The church was demolished in 1747, but 156 pieces of it were found in 1935 beneath the floor of the new church. In the 1950s the church was reassembled and erected on a new site using original parts of the building along with surplus material from restoration work on Heddal stave church. As it stands now, the church has four extra staves supporting the roof. On the whole, the stave church is in good condition. In 2010 the church was given new shingles in connection with the Stave Church Preservation Programme. The shingles were replaced individually to retain as much of the original shingles as possible. The roof was also given new gable boards, weather boards and ridge boards where needed. The condition of the church art was assessed and found to be good.

NOTES

Notes to Chapter 2

- 1 The documentation has been carried out with traditional techniques such as reports, photographs and measurements, but 3D scanners and photogrammetry have also been used.
- 2 Other work has been done on these churches in connection with the Stave Church Preservation Programme. Reports on all the work in the Stave Church Preservation Programme are described and documented in the archives of the Directorate for Cultural Heritage.
- 3 Two project leaders have served in the course of the programme: Ellen Devold 2001–2007 and Sjur Mehlum 2007–2015, whereas Harald Ibenholt has been section chief the entire period.
- 4 Terje Planke's Chapter 6.
- 5 Venice Charter, 1964.
- 6 ICOMOS International Wood Committee (IIWC) 8th International Symposium. Trondheim 1994, p. 19.
- 7 Nara Conference, p. XI.
- 8 Mehlum: "Autentisitetskriteriet og Kaupanger stavkirke, Dissertation in Ethnology, University of Oslo, 1999, where this topic was discussed.
- 9 Marumsrud and Aamodt: "Nore og Uvdal stavkirker. Tømmerkvalitet og Materialfremstilling". Unpublished report, the Directorate for Cultural Heritage 2002.
- 10 See Chapter 5 by Terje Thun et al.
- 11 Borgund Stave Church, and its exterior in particular, has swayed the general perception of how a stave church should look more than any other. Borgund has thus also served as the model for several stave church restorations, as for example Hopperstad.
- 12 Bjerknes: "Om romansk og gotisk i våre stavkirker"]. In: *FMEÅB* 1944, published 1946.
- 13 This refers to just a few shingles which are partly protected from exposure beneath the tower
- 14 Some of the poorest shingles at Borgund were placed as late as round the year 1990. The same was the case on, for instance, the Hopperstad and Nore Stave Churches
- 15 3D-scanning is a digital documentation method, in which point measurements are made with a laser.
- 16 This proves to be a very practical way of performing the work, organisationally too, as the carpenters at work already had models for their work at the test sites. These could be used in the specific work situation where the craftsmen were making their decisions.
- 17 Christie: "Urnes stavkirkes forløper. Belyst ved utgravninger under kirken" *FMEÅB* 1958, Oslo 1959; Bjerknes: "Urnes stavkirke. Har det vært to bygninger forut den nuværende kirke?" [Urnes stave church. Have there been two buildings prior to the present church?]. I: *FMEÅB* 1958, Oslo 1959; Krogh: "Kirkerne på Urnes". I: *Aarbøger for nordisk oldkyndighed og historie* 1971, Copenhagen 1972.
- 18 So much of the material to allow the visualisation of the precursor to today's church. See Christie: *Urnes stavkirke*, Oslo 2009; Krogh *Urnesstilens kirke*, Oslo 2011.
- 19 Examinations by, among others, Geological Survey of Norway, report 2006.044, 2006 and the consultant engineering firm Multiconsult, report 6110779-1 and the memo G-42, both in 2007.
- 20 Gjelsvik and Marumsrud: Inspection report 2008. Archives of the Directorate for Cultural Heritage.
- 21 No definite conclusion has been possible to make about this yet, but there are indications that the northern and southern staves were at more or less the same

- level around 1960, at that the sinkage has occurred afterwards.
- 22 The pulpit, the Calvary group and the wall and ceiling decorations were not removed, but covered up.
 - 23 Frost heave and poor drainage were just elements among other causes.
 - 24 A task which also resulted in information about the earlier churches. This was pioneer work in Norway and the first of several excavations beneath stave churches.
 - 25 Letter jnr. 94 – A/NK – 1969. HC:LHH, A-284. Urnes Stave Church, archives of the Directorate for Cultural Heritage.
 - 26 The Directorate for Cultural Heritage's archaeologists were on an inspection and concluded that archaeological monitoring was unnecessary. Knud Krogh has later the Directorate for Cultural Heritage for the lack of archaeological investigations while this work was being done. See Krogh's contribution and the reply from the Directorate for Cultural Heritage in *Fortidsvern* no. 4, 2015.
 - 27 Chapter 5 by Terje Thun et al.
 - 28 Devold 2004: "Stavkirkene og autentisiteten". I: *FM-FÅB* 2004. More details are provided here about the work at Nore. Ellen Devold was project leader until 2007.
 - 29 Op.cit. A description is given here for the work with the campanile.
 - 30 Restaureringen a Klokkestøpul dokufilm as 2006. This DVD documentary of the restoration of the campanile includes an interview with the project leader Ellen Devold, the Directorate for Cultural Heritage and the carpenter on the job, Erlend Gjelsvik.
 - 31 Lidén 1991: *Fra antikkvitset til kulturminne*, pp. 30–35.
 - 32 Trøim: "Kulturminneloven – et hundreårsminne". I: *FMFÅB* 2005.
 - 33 Only Urnes Stave Church has been systematically investigated. Two monographs about the church have been published, see the literature list.
 - 34 This is based on the archives of the Directorate for Cultural Heritage, where there are nearly no reports or documents about these churches.
- 2 The Cultural Heritage Act 2009, § 4, § 13 and § 12a.
 - 3 T-3/00 2000, point 2.4.
 - 4 Haltdalen stave church was not included in the condition reports project as the church has no furnishings other than an altar..
 - 5 The condition report describes the object's current state with regard to original materials and surface treatment versus secondary changes.
 - 6 The numerical values and their significance are taken from Norsk Standard NS 3423:2004. Before this was available, the condition was characterised using a scale of 1–4, where 1 stood for «good standard» and 4 meant «intervention necessary». When all the conditions were analysed in 2015, the first registrations were converted to the above standard.
 - 7 Gol stave church at the Norwegian Folk Museum has not undergone a second registration as the first condition registration was carried out in 2013.
 - 8 Stave churches with triptychs: Grip, Hedalen (Hedalen Madonna, corpus, crown), Kvernes (missing side doors), Reinli (four side doors), Rollag (relief with Mary and child). Stave churches with medieval crucifixes: Eidsborg, Hedalen (a crucifix and a foot which probably belonged to a crucifix), Nora, Ringebu (two), Redden, Roldan, Eye. Stave churches with calvary groups: Rollag and Urnes. Stave churches with other medieval sculptures: Hedalen (relief with a writing angel), Ringebu (St. Laurence). Stave churches with distemper decoration (-fragments) from the Middle Ages: Borgund, Eidsborg (originally from Lårdal stave church), Hedalen, Heddal, Hopperstad, Rollag, Torpo.
 - 9 Objects registered with unknown conditions were either inaccessible at the time of registration or moved after the first registration upon the recommendation of the Directorate of Cultural Heritage. Art and furnishings in Gol stave church were only registered once, which also helped to increase the number of "unknowns" in the second condition register.
 - 10 Plahter 2010, p. 64.
 - 11 The consolidation of the calvary group at Urnes (Frøysaker 2003) and the medieval decoration on the ceiling of the lectorium in Torpo stave church are good examples of this type of treatment strategy (Kjølsten 2009).
 - 12 See Sjur Mehlum's chapter 2.
 - 13 Frøysaker 2003, p. 9. Here a calvary group means a sculptural portrayal of Christ on the cross with Mary and St. John on either side.
 - 14 Frøysaker 2003, p. 19, p. 43.

Notes to Chapter 3

- 1 T-3/00 2000, Forvaltning av kirke, kirkegård og kirkens omgivelser som kulturminne og kulturmiljø 2000, (The management of churches, churchyards and church surroundings as cultural heritage and cultural environments 2000) point 1.1

- 15 Frøysaker 2003, p. 10.
- 16 Frøysaker 2003, p. 40.
- 17 The examination of the crucifix showed that the cross and sculpture did not originally belong together. See Strandskogen and Nyhlén 2003, p. 40.
- 18 For dating of the crucifixes, see Stein 2003a, pp. 20–25.
- 19 Strandskogen and Nyhlén 2003, p. 46, 48. Brunken and Tveit 2003, pp. 68–69.
- 20 Stein 2003a, p. 7.
- 21 The sculpture's original left leg and foot were found in the church in 1975 and deposited in the Museum of Cultural History, UiO. The leg was reattached to the sculpture in 2003. Strandskogen and Nyhlén 2003, p. 40.
- 22 Gjertsen 2002, p. 9.
- 23 Gjertsen 2002, p. 10.
- 24 Polychrome (multi-coloured) is used here to denote colours and metals used on sculptures.
- 25 Stein 2003a, p. 10.
- 26 The transformation was so convincing that the art historian Martin Blindheim of the University of Oslo was unsure whether the Ringebu II crucifix was a crucifix for the 1700s or a medieval crucifix. Blindheim 1987, p. 32. Blindheim probably based his assessment on observations made from the floor of the church.
- 27 For a more detailed discussion of the treatment of the two crucifixes, see Stein 2003a, pp. 28–32.
- 28 Christie and Christie 1981, vol. 1, p. 377.
- 29 Stein 2002, p. 2. The white paint on the wall is the fourth layer of overpainting (Norsted 2006, p. 2). It may date from the 1960s when the panel in the nave was removed and the church was restored (Christie *op.cit.*, p. 279).
- 30 Norsted 2006, p. 1.
- 31 Stein 2002, p. 2.
- 32 Oral communication with project manager Jørgen Solstad, 1.9.2015. For studies of the colours see Norsted 2006, p/ 1.
- 33 Norsted 2006, p. 2.
- 34 Solstad 2008, pp. 10–11.
- 35 Solstad 2008, pp. 10–11.
- 36 Brønne 2012. Stein 2003b.
- 37 Hohler 1987, p. 95. Hohler expressed this opinion in connection with the preservation of medieval art in churches but we think this opinion is also valid for the preservation of the church interior in its entirety.
- 38 A third point that is significant when choosing the form of treatment is the condition of the object and what it is possibly to do technically.
- 39 Fortidsminner XLVIII. 1962, p. 31.
- 40 Stein 2003b, pp. 155–162
- 41 Rollag kirke. Report from the colour restoration of the chancel of Rollag church. Alfred Hagn 08.09.1933, p. 1. Directorate of Cultural Heritage archives
- 42 Christie 1982, pp. 242–243.
- 43 Unless otherwise stated, , all factual information about the calvary group is taken from Frøysaker 2003.
- 44 Blindheim, M., 1998, pp. 47–48.
- 45 The cross is 227 cm high and 170 cm wide. Mary and St John are 116 cm and 118 cm high respectively.
- 46 Frøysaker and Kollandsrud 2006.
- 47 Chalk suitable for using as a primer is not found in Norway. Chalk analyses can be used to identify the origin of the chalk. For chalk analyses, see Perch-Nielsen and Plahter 1995. Frøysaker and Kollandsrud 2006, p. 56.
- 48 Frøysaker 2003, pp. 33–35.
- 49 For dating, see Stein 2008, p. 10.
- 50 Unless otherwise stated, all information about the examination of the crucifix is taken from Stein 2008. The cross measures 234 x 185.5 x 21 cm. Before it was reduced in size, probably to fit on the altar it was about 50 cm taller. The sculpture is 133 cm high.
- 51 Or: *Alnus* ssp. Analysed at the Norwegian Institute of Tree Technology, Oslo, in 2015. Nine out of ten samples were identified as alder, the tenth as pine. See Mahnert 2015. The pine sample could be a pollutant from the dowel that fastens the figure to the cross and which was right next to the sample site. Alder is seldom used for making crosses. To date it has only been identified in the Rauland crucifix cross, dated to around 1225. Plahter 2014, p. 323.
- 52 Wood anatomy analysis by Høeg-Pollen. 14.9.2007. NIKU J.nr. 488. Ark. 568.
- 53 The crucifixes from Urnes, Rollag and Rauland have haloes fixed to the cross.
- 54 Alternatively they could have been painted like the cross medallions on the Røldal crucifix, with white vines on a red ground..
- 55 Carnation means skin-coloured.
- 56 For dating of the frontal, see Plahter 2004, bd. 3, p. 23.
- 57 Blindheim 2004, p. 96.
- 58 Blindheim 2004, p. 39. A drawing of the relief's outlines, located on the cross medallion, shows that there was no room for it there. Stein 2008, p. 27.
- 59 Fett 1911, p. 14, Lange 1973, pp. 5–6, Lange and Svanberg 1994, pp. 23–36.

- 60 Lange og Svanberg 1994, pp. 23–36.
- 61 Blindheim dates the Madonna sculpture (and the triptych) to 1230–1240 (Blindheim 2004, p. 96), while Morgan dates it (and the triptych to 1250–1275 (Morgan 2004, p. 43).
- 62 Stein 2010, p. 58–91. Andersen 2010, p. 92–111.
- 63 For more infra-red images of the arcade arches, see Stein 2008, pp. 54–55.
- 64 Stein 2010, p. 73ff.
- 65 Stein 2010, p. 59.
- 66 Stein 2010, p. 80ff.
- 67 For chalk analysis, see Perch-Nielsen and Plahter. 1995, p. 153.
- 68 Andersen 2015, pp. 149–153.
- 69 Unless otherwise stated, all factual information about the Ringebu I crucifix is taken from Strandskogen and Nyhlén 2003.
- 70 Wood anatomy analyses by Høeg-Pollen. 14.9.2007. NIKU J.nr. 488. Ark. 568.
- 71 Oak and pine are assessed visually.
- 72 The cross measures, without tapp 196 x 134.5 cm. The sculpture is 84 cm high.
- 73 The cross measures 237 x 153.3 cm. The sculpture measures 122.5 x 89.5cm. Unless otherwise stated, all factual information about the Ringebu II crucifix is taken from Bronken and Tveit 2003.
- 74 The decoration covers the wall plate's lower member, which is about 525 cm long and 25 cm wide. The upper member was removed in about 1760. Christie and Christie 1981, vol. I, p. 322.
- 75 Unless otherwise stated, all factual information about distemper paint decoration is taken from Stein 2003a, pp. 20–24. The binder was assessed visually: the distemper paint decoration darkens temporarily due to the effects of humidity..
- 76 Lillegrend 2012, p. 15.
- 77 Plahter 2004, vol. 3, p. 31, p. 33, p. 39, p. 41.
- 78 For tree-ring dating of Rollag stave church, see Thun et al: chapter 5.
- 79 The cross measures 106.5 x 78 cm. Something ash been cut away at the top of the cross.
- 80 Engelstad 1936 p. 219.
- 81 Christie and Christie 1981, vol 1, p. 343.
- 82 Unless otherwise stated, all factual information about the Rollag crucifix is taken from Heggenhougen 2007.
- 83 The cross halo on the crucifix in Vester Hjerimitslev kirke, Ålborg Stift, Denmark, is of the same type as the Rollag crucifix. This crucifix is dated to about 1500. <http://aalborgstift.dk/kirker/jammerbugt/vester-hjerimitslev-kirke/krucifix/> June 2015.
- 84 For the Fall of Man painting, see Stein 2007, pp. 119–124.
- 85 Hessdalen church has a two-wing altar piece from the 1600s painted in distemper (Wedvik 2009).
- 86 Unless otherwise stated, all factual information about the Fall of Man is taken from Stein 2007.
- 87 For dating of the original painting on the ceiling, see Christie and Christie 1981, vol. 1, p. 344.
- 88 Stein and Verweij 2014, pp. 16–17.
- 89 Laugerud 2005, p. 9
- 90 Stein and Heggenhougen 2007, p. 66.
- 91 Church records for Rollag, folio 23. Transcript in Norges Kirkers archive, the Directorate of Cultural Heritage.
- 92 Wedvik 2007, appendix 7.
- 93 Wedvik 2007, p. 15.
- 94 Olstad and Haugen 2012.

Notes to Chapter 4

- 1 “In 1709, for example, it says that Borgen church is a very old stave church with a special and curious design with several galleries, well-maintained and with a painted vaulted ceiling and well-decorated interior.» (Hoff 2012). The stave church was restored in the 1870s. “The aim was to achieve an authentic medieval situation [...] The post-Reformation interior painting was removed [...]”. (Information obtained 04.08.15: http://www.norgeskirker.no/wiki/Borgund_stavkyrkje)
- 2 Distemper decoration is registered in 69 churches. The overview includes information about the size of the decoration, location, date and condition (Olstad and Kaun 2011).
- 3 I would like to thank the archaeologist and research fellow Jan Brendalsmo, painting conservator and professor emeritus Jon Brønne and art historian and research fellow Anne Marta Hoff for support and information while working on this chapter.
- 4 Consolidation is defined as: Stabilisation, improvement of internal cohesion or mechanical stability, usually by adding material. NS-EN 15898:2011, p.11, point 3.5.4. Often described by conservators and others as conservation.
- 5 The decoration is dated 1668 on the text panel in the decoration (Berg 2010). The church accounts for Hopperstad Church for 1687 show that the ceiling and the walls in the middle of the church were painted.

- Transcript of accounts in the archives of the Directorate of Cultural Heritage..
- 6 Letter dated 22 March 1888 in the archives of the Directorate of Cultural Heritage.
- 7 Holstad 81, p. 46. The quotation was obtained on 05.08.2015 from: https://no.wikipedia.org/wiki/Hopperstad_stavkirke
- 8 Fett 1917, p. 44.
- 9 Fett 1911.
- 10 In the summer of 1901 a team of three architects, a painter and an art historian stayed in Numedal for six weeks to measure and draw the three stave churches at Rollag, Nore and Uvdal. They called this the “expedition to Numedal”. Aubert 1902 (a), pp. 105–114.
- 11 Aubert 1902 (a), pp. 105–114.
- 12 Aubert 1902(b), p. 293.
- 13 Aubert 1902(b), p. 304.
- 14 Aubert 1902(a), p. 106.
- 15 Aubert 1902, p. 315.
- 16 Aubert 1896, p. 16.
- 17 Munthe 1896, p. 338. The Norwegian dictionary of artists describes Munthe’s relationship to “the national” and the contact between Munthe and Aubert. Poulsson, 2013. See also Munthe 1919, pp. 63–64.
- 18 Munthe 1896, p. 338.
- 19 The Church Act of 1851 decreed that the parish churches should have room for at least three-tenths of the population..
- 20 Schnitler 1925, pp. 357, 363–367.
- 21 Lexow 1926, p. 152.
- 22 Grevenor 1927, p. 192–194. Nicolaysen 1882, p. 14, plate XXVI.
- 23 Mohn 1938. Minutes from a meeting of Foreningen Brukskunst shows that in 1931 Mohn was present at the same meeting as Finn Krafft, active in the society and a restoration consultant at the Directorate of Cultural Heritage. 1946–1963, and Arne Nygaard Nielsen, employed at the Directorate of Cultural Heritage from 1927, director 1946–1958. These may have been important sources of support for the work on the decoration in the churches. Hylbak 2007.
- 24 Mohn 1938, p. 86.
- 25 Mohn 1938, p. 9.
- 26 Aavitsland 2012, pp. 59–60. Fett was director of the Directorate of Cultural Heritage from 1913–1946.
- 27 Erdmann 1940.
- 28 Finn Krafft, Odd Helland and Jon Brønne. The Directorate of Cultural Heritage’s most recent restoration consultant, the painting conservator Jon Brønne’s work on decorative painting resulted in a book on decorative painting in 1998.
- 29 Kvernes stave church 1963–1977. Olstad and Kaun 2012, pp. 26–29. In connection with these church restorations, the distemper decoration was treated using the current available materials and in line with the changing restoration principles.
- 30 See also Christie 1982, pp. 139–141 and 157–159. These two worked together on *Norges kirker (Norway’s churches)* from the middle of the 1950s, when Christie started, until 2014 when Hoff retired.
- 31 Olstad and Solberg 1998, p. 177. The analyses prove that a protein-based glue was used. The analyses carried out at the end of the 1990s that identified casein or egg, have not been confirmed by later analyses and the results are uncertain. Through analyses made as part of the Stave Church Preservation programme, oil has been detected in some decoration from the 1600s. It is uncertain whether this is due to later treatment, or if oil were added to the glue as a binder. Analysing glue as a protein-containing binder is complicated.. The protein composition is typical for each type of glue and the proteins are defined by the combination of amino acids for each individual protein. In spite of several analysis methods being used in parallel, the chances of incorrect interpretation are high and the amount of glue may be too small for the analysis instruments to detect.
- 32 Bugge discusses the rediscovered decoration from Lårdal Church and mentions this in connection with the wall paintings in Södra Råda, which are similar to the Norwegian medieval decoration. Bugge 1922, p. 187. Analyses in Södra Råda: Hedlund 2007, p. 17. The lack of analyses of Norwegian distemper decoration from the Middle Ages is confirmed by professor emerita, UiO, Unn Plahter 12 October 2015.
- 33 Olstad 2003, p. 5.
- 34 Some areas of colour in the 1700s decoration have damage that the NIKU conservators think is due to the painting technique.
- 35 Anon 1796, p. 20.
- 36 Brønne 1982, p. 196.
- 37 Christie and Christie 1981, p. 104–105. Olstad 1999, p. 6–10.
- 38 The analyses give conflicting information. See also Anon 1794, p. 64. Here it is recommended that knots in the wood be covered with garlic before applying glue to the surface prior to the white base coat.
- 39 Anon 1794, p. 10. “For architectural decoration, lines are used [...] A lead plumb bob is needed with a very

- fine thread for the vertical lines, together with a carpenter's square and a pair of compasses [...]".
- 40 Wickstrøm 1981, p. 301
- 41 Plahter describes modelling techniques based on oil paintings in the 1100s and 1200s and links differences to the area of painting and the binder. Plahter 2014, pp. 311–314.
- 42 The decoration in Torpe is dated and described in *Norges kirker Buskerud* (Norway's churches Buskerud): Christie and Christie 1981, pp. 132–136.
- 43 Provisionally dated to second half of 1200s. Stein and Heggenhougen 2007, p. 3. See Stein and Schonhowd's discussion of the decoration in their chapter in this book.
- 44 The decoration is described as medieval. Christie and Christie 1981, p. 377.
- 45 Erdmann 1940, p. 10.
- 46 Wedvik 2012.
- 47 Wedvik 2008, p. 7 and Wedvik 2012, pp. 21, 23 and 24. Erdmann notes a similarity between the decoration in the chancel at Heddal and the decoration in the now-demolished Gårå Chruch, Telemark, sketched by F.W. Schiertz in 1837. Erdmann 1940, p. 10. The sketch is shown in Hauglid 1973, p. 384.
- 48 Dating: Kloster 1969, p. 76 and Hauglid 1973 p. 388. Reference: Kloster 1969, p. 76.
- 49 The painting has been treated. The treatment has not been documented..
- 50 "Decoration in the baldachin above the west side altar appears doubtful based on the assumption that it is from the Middle Ages p. The decoration on the roof is painted directly on to the wood. The drawing is imprecise and the colours are thin and cloudy. Where the background colour between the figures has worn down to the wood the colours on the adjoining figures are intact... This may indicate a radical repainting [...]". Kaland 1958, p. 1. "The baldachin paintings are amazing well-preserved. At first we thought we were looking at a copy, but upon closer inspection we think it must be an original painting [...]" Brønne and Olstad 1983, pp. 3-6. Reports in the archives of the Directorate of Cultural Heritage. See also Anker and Havran 2005, p 134. There will undoubtedly be a need for further research to be able to date the decoration. See also: Fett 1917, pp. 45–46.
- 51 It is maintained that during the restoration of the church in the 1880s the ciborium was taken down to the river and washed and scrubbed with sand to remove the painting. Holstad 1981, p. 46.
- 52 The decoration is not dated but belongs to the medieval church. Christie, Storsletten and Hoff 2012.
- 53 Assessed by art historian Elisabeth Andersen, NIKU and the author based on colour fragments and location of the decoration.
- 54 The decoration is described as medieval. Anker and Havran, p. 212.
- 55 Report from Finn Krafft, February 1959. He describes the motifs he has added to the decoration in report dated 01.06.1959. Reports, drawings and photographs in the archives of the Directorate of Cultural Heritage.
- 56 Bugge 1953, p. 60.
- 57 Christie and Christie 1999, p. 25.
- 58 Wickstrøm 1981, p. 300–301.
- 59 Weisser-Svendsen 2007. Bugge 1922, p. 186.
- 60 The decoration is dated on an inscription in the church.
- 61 Dated on memorial in the church and elsewhere.
- 62 This is the author's approximate date. Anker and Havran 2005, p. 333 date the decoration to the 1600s.
- 63 Date painted on the decoration.
- 64 Olstad 2008, p. 7.
- 65 Hoff and Andersen 2012.
- 66 Dated on area of text on the decoration.
- 67 Anker and Havran 2005, p. 156.
- 68 Christie and Christie 1981, p. 278–279.
- 69 Christie and Christie 1981, p. 331–334.
- 70 Christie and Christie 1981, p. 377.
- 71 Christie and Christie 1981, p. 409–140.
- 72 Christie and Christie 1981, p. 52.
- 73 1604 north wall, 1649 south wall. The portrait of the priest on the south wall belonged to the now-demolished east wall and is probably from 1604. Erdmann 1940.
- 74 Anker and Havran 2005, p. 170.
- 75 Erdmann 1940, p. 8.
- 76 Hiortøy 1785, p. 134.
- 77 See for example Amundsen 2010.
- 78 Rød or Nettet stave church, demolished in 1885, in Indre Romsdal has "Paintings on the walls of the biblical History" painted in watercolours in 1633. Schønning 1910, p. 124. The Rød church was of the same type as Kverne p. Sinding-Larsen 1969, p. 84. One might speculate whether this was the same type of decoration as the contemporaneous decoration in Kverne p. Brønne 2008, p. 115–121.
- 79 In Rollag the 1700s decoration is painted on elements from the 1700s in the church with overpainting from

- the 1800s. The 1719-paintings in Ringebu is mostly repainted in 1921
- 80 A little in Olstad and Solberg 2001, p. 33–35.
- 81 I have tried to look for parallels with post-Reformation Norwegian distemper decoration elsewhere in Europe. To date I have not found any decoration with a direct likeness even though elements in the decoration are the same as the Norwegian. See e.g. the catalogue in Grote and Königfeld 1991. The Polish wooden churches in the area south of Krakow are richly decorated with distemper decoration, but the decoration is, not surprisingly, quite different to the Norwegian type.. See: Wooden churches in South Małopolska, <http://whc.unesco.org/en/list/1053> Information retrieved 14.03.16.
- 82 Mejborg 1888, p. 26–27 and 31.
- 83 Mejborg 1888, p. 30.
- 84 The building is now at the Anno Museum, Domkirkeodden, Hamar.
- 85 Bolten aff Rusach 1648.
- 86 The accounts provide an overview of the materials, including pigments, that were required for use in the royal properties and ships. Weber-Andersen 1955. See also Brønne 1998.
- 87 The pigments that were found through the analyses were listed both in the Colour Chamber's accounts and in the painters' handbooks from the period. Olstad and Solberg 1998, p. 177. In 2015 analyses were carried out under the auspices of CATs, Denmark.
- 88 Olstad and Solberg 1998, p. 177.
- 89 Mohn 1933, p. 13.
- 90 Stein and Olstad 2012, p. 10. Auripigment (Latin: *auripigmentum*) is a yellow pigment based on a mineral that contains arsenic and sulphur
- 91 Hedlund 2007, p. 18–19.
- 92 Hedlund 2007, p. 20.
- 93 Kaland 1957, p. 3.
- 94 Grevenor 1927, p. 25.
- 95 Grevenor 1927, p. 12–13.
- 96 Schnitler 1925, p. 353.
- 97 Schnitler 1925, p. 360 and Christie 1982, p. 121.
- 98 Schnitler 1920, p. 13, Lexow 1926, p. 152, Mohn 1938, p. 36–38.
- 99 Grevenor, p. 23 and 36.
- 100 Christie 1982, p. 142–144. Grevenor, p. 27–36.
- 101 The motif was observed by the author on a visit to Ephesus. I have not had the opportunity to follow the progress of the motif throughout Norway and over time until it reached the Urnes painter.
- 102 Christie and Christie 1981, p. 381.
“CCLII Edition with 800 pictures to explain the biblical language, or a so-called picture bible, suitable for edification and for young people to use so that they learn to call everything by its correct name and recall without any problems the language of the Holy Scriptures (1710)”. Information retrieved from: Den Store Danske, Weinreich, T., 2006. The history of children's literature: Danish children's literature through 400 years <http://www.denstore-danske.dk>
- 103 Schnitler 1925, p. 363–364, Grevenor 1927, p. 190–191.
- 104 Frøysaker 2003, p. 49–50.
- 105 Schnitler 1925, p. 357.
- 106 Mohn 1938, p. 17–18. The decoration in Malmö is shown in Mejborg 1880, p. 73, fig. 81, text p. 74.
- 107 Christie and Christie vol. 3. p. 232. Olstad and Solberg 1998, p. 178.
- 108 The church accounts were given to me by Anne Marta Hoff, August 2015.
- 109 Erdmann 1940, p. 106.
- 110 Seth Bogarth and Johan Hansson Contrafeier started in Trondheim and were active in the same period. Information retrieved 05.07.15 from: http://no.wikipedia.org/wiki/Johan_Contrafeier
- 111 It is not unexpected that the red ground was painted between the vines. This may have been done to save paint, but was most likely done to avoid the red running into the grey-white vines..
- 112 Olstad et al. 2013, p. 11.
- 113 Christie 1982, p. 140.
- 114 Rollag vicarage is said to be Norway's oldest surviving vicarage with a farmhouse from the 1600s. <https://snl.no/Rollag> Information retrieved 14.03.16.
- 115 Olstad and Solberg 2001.
- 116 “24 calfskins for making glue x 4 units – 1 Riksdaler”. Information from Anne Marta Hoff 11.08.15. Tine Frøysaker's studies of the 1600s painter Gottfried Hendtzschel's work confirms though numerous church accounts that glue was usually boiled up on site (Frøysaker 2003, p. 59, 60).
- 117 No information has been found about the price of chalk in the 1600s. At an estate auction in 1694, lead white was valued at 8 shillings per kilo. (Brønne 1998, p. 61). The difference in price between chalk and lead white has always been stable according to Brønne. In 1894, 100 kg of lead white cost 60 kroner: the same amount of chalk cost 2.5 kroner (Information from

- Brønne). With this ration a kilo of chalk cost 0.3 shillings in 1694.
- 118 A lead-white paste (linseed oil and lead-white pigment) contains about 15 per cent oil. This then has to be thinned with oil so that it can be used in painting.
- 119 “The priest Knud Winther, who acceded in 1651, writes in the parish record that after he had been in post for 1½ years he allowed the church to be painted”. Christie and Christie 1981, p. 331
- 120 Frøysaker 2003, p. 53.
- 121 Transcript of the church accounts for Hopperstad church in the archives of the Directorate of Cultural Heritage. Card marked: L. NR.:49 Costs 1687, 1688 and 1698: “1687: Let the middle part of the church below the ceiling and the walls be painted which has cost 16 Riksdalers. Of this the people have paid 8 Riksdalers. The church funds have paid the remaining Riksdalers.”
- 122 Niels Målar’s name appears several times in the Sogn accounts for the 1650–60s. Niels Målar or Niels the painter may be identical to Niels Hansen who became a citizen of Bergen in 1631. Mohn 1938, p.30. In the chancel there is an inscription that states who paid for the painting in 1659.
- 123 Transcript of church accounts for Årdal church in the archives of the Directorate of Cultural Heritage: “Kept two painters for painting the church paid for by the farmers. For their board and lodging for 4 weeks, 2.5 Riksdalers 1 ort”.
- 124 Information from Anna Marta Hoff 11.08.15: The church record book for Jostedal in the National Archive in Bergen has the following information about painting in the years 1714–1716.
- 125 Ringebu main church, church court 1675–1722, in the National Archives in Hamar. Accounts 1719, p. 72b. Transcribed by archivist Ester Olstad, Hamar.
- 126 Mohn 1983, p. 33. The church burnt down in 1992. Upon rebuilding it was not possible to reconstruct the wall paintings that stood in the church before the fire.
- 127 Korporal Sundsted was a local painter and is identical with the painter Peter Kastrud. Information retrieved on 05.08.15: https://nbl.snl.no/Peter_Friderichsen_Kastrud_Ringebu_main_church,_church_court_1675-1722,_in_the_National_archives,_Hamar._Accounts_1724-1807,_p._24a_and_27a.
- 128 Several of the decoration painters in Telemark who worked in secular buildings, including Olav Hansson (1750–1820) often painted the upper parts of the space with distemper and the lower part with oil paint, so that the affected zone could tolerate more. Information from painting conservator / professor emeritus Jon Brønne.
- 129 Other values that are naturally associated with church art also go together with the state of preservation and the treatment history.
- 130 For the church’s values, see for example: Andersen et al. 2015. For the use of values in conservation, see: Mason 2002.
- 131 The decoration was overpainted pre-1865 “several times with pale red oil paint” according to a note from the restoration consultant Finn Krafft in the archives of the Directorate of Cultural Heritage. The decoration in the interior is described and drawn by Domenico Erdmann. (Measurements and drawings in the archives of the Directorate of Cultural Heritage).
- 132 Erdmann’s report from September 1933 in the archives of the Directorate of Cultural Heritage describe “colour treatment” of the decoration.
- 133 Olstad 1995.
- 134 Consolidation: stabilising, improving internal cohesion or mechanical stability usually by adding material. NS-EN 15898:2011, p. 11, point 3.5.4. Also described as conservation.
- 135 The work was carried out by NIKU. The reports are filed in the archives of the Directorate of Cultural Heritage.
- 136 Aaraas et al 2000, p. 198.
- 137 NIKU has investigated the opportunity to be able to uncover the work but has not yet found a suitable method Olstad 2008, p. 37.
- 138 Christie 1969, p. 83.
- 139 DSPI Digital speckle pattern interferometry and DIC Speckle decorrelation. The methods use reflected laser light with the help of a camera to register the structure of the paint layer and transfer this to a PC as a black and white speckled “moiré pattern”. Irregularities in the paint structure, for example, scaling in the paint layer, will be shown as irregularities in the speckled black and white pattern. By comparing the result of the registrations on a limited area of decoration before and after the heating season, changes in the “moiré pattern” and the film of paint can be observed.
- 140 Lasyk et al 2012.
- 141 When scanning with structured light a photo scanner of the type GOM ATOS 2e was used. Three areas were scanned which varied ns size and shape but which were about 30 x 30 cm . The surface profilometer registers

- an area of exactly 5 x 5 mm. 28 points were scanned with the same area that was used for optical scanning.
- 142 Olstad et al 2012, p. 29–32.
- 143 The method is described in Brønne 1987, Solberg and Olstad 1994.
- 144 Sturgeon glue is a product of the sturgeon's swim bladder. Because sturgeon is a threatened species, only farmed sturgeon can be used Solstad and Muniz 2004.
- 145 Olstad and Apalnes Ørnhøi 2014.
- 146 Olstad and Apalnes Ørnhøi 2015.
- 147 Aubert 1896, p. 17.
- 16 Gjerdrum. 2013, pp. 228–231.
- 17 When the number of year in the heartwood is between 6 and 22 years, and between 105 and 162 years, the deviation is from -2 to -9 years.
- 18 Where it is stated that an extant building dates to before 1650, it is automatically listed, cf. the Cultural Heritage Act, section 4.
- 19 This plank is numbered plank 15 from the east in the section on Urnes stave church. In Knud Krogh's *Urnesstilens kirke (The Urnes-style church)* this is numbered plank 16/F. Krogh has numbered the portal's lintel as 15/E, but it has not been surveyed using dendrochronology.
- 20 Dietrichson 1892, Bugge 1953, Hauglid 1976, Anker 1997, Hohler 1981, 1989.
- 21 Professor Axel Christophersen, NTNU University Museum, personal communication to Terje Thun.
- 22 The congregation wanted to tear down the church at the end of the 1870s. Thanks to an initiative from the Society for the Preservation of Norwegian Ancient Monuments, the church was saved and moved to Bygdøy in 1884.
- 23 The samples were taken by Terje Thun, NTNU University Museum.
- 24 Additional samples were taken by Jan Michael Stornes, NIKU.
- 25 The samples were taken by Terje Thun, NTNU University Museum.
- 26 At the sample site it was assumed that as many as 30 years could be missing in the outer layer. Only new samples could provide a definite felling date.
- 27 Berg 1989. Bd. I, p. 75.
- 28 The samples were taken by Terje Thun, NTNU University Museum.
- 29 Hohler 1999 I, s. 131, 110 f.
- 30 The samples were taken by Terje Thun, NTNU University Museum.
- 31 Peder Gjerdrum's formula $A_s = 56,6$ and Bartholin's formula $A_s = 55,2$.
- 32 The decor is preserved behind the memorial in the crossing.
- 33 The samples were taken by Jan Michael Stornes, NIKU together with Håkon Christie, NIKU.
- 34 The samples were taken by Nils Brandt.
- 35 Christie, Storsletten and Thun 1999, pp. 141–152.
- 36 The samples were taken by Jan Michael Stornes, NIKU together with Håkon Christie, NIKU.
- 37 The samples were taken by Ola Storsletten, NIKU.
- 38 The additional samples were taken by Jan Michael Stornes, NIKU.

Notes to Chapter 5

- 1 There is no good Norwegian word for *cross-dating*, but “overlapping tree ring chronologies” is synonymous.
- 2 Douglass 1937, pp. 3–6.
- 3 Douglass 1929, pp. 736–770.
- 4 Eckstein 1983, pp. 125–136.
- 5 Ording 1941a, pp. 101–354, Ording 1941b, pp. 91–130. Eidem 1953, pp. 1–155.
- 6 See the section on core samples below.
- 7 The samples were taken by Nils Brandt, who was a fellow at the University of Oslo. He was awarded a dr.philos.in 1969 and later became a lecturer in the school system.
- 8 Thun 2009, pp. 37–42.
- 9 Thun 2002, pp. 1–336. Thun 2005, pp. 63–74. Since 1999, dendrochronological dating has been published in Fortidsminneforeningens Årbok (FMFÅB) almost every year.
- 10 Gunnarson, Linderholm and Moberg 2011, pp. 97–108. Svarva 2009, pp. 1–58. Master thesis, NTNU. Kirchhefer 1999. Dr.scient. thesis, University of Tromsø. Solberg 2002. Dr.scient.thesis, NTNU.
- 11 It is possible to perform an internet search for dendrochronology. The “ultimate tree ring web pages” website is also to be recommended.
- 12 Here the word sapwood is used throughout for the outer, lighter part of the wood that is often visible on a cross-section of pine. The opposite is heartwood: the darker part inside the sapwood.
- 13 Stornes, Thun and Bartholin 2013. I: FMFÅB, pp. 237–244.
- 14 There is a large amount of literature about this including Baillie 1982. *Tree-Ring Dating and Archaeology*.
- 15 Gjerdrum. Dr.scient.thesis, 2002, pp. 19, The Norwegian Agricultural College in Ås (now the Norwegian University of Life Sciences)

- 39 Bonde 2013, pp. 1–19.
 40 The samples were taken by Nils Brandt.
 41 Håkon Christie, Riksantikvaren. Personal communication to Terje Thun, ca. 1990.
 42 The samples were taken by Nils Brandt.
 43 The samples were taken by Ola Storsletten, NIKU.
 44 The samples were taken by Nils Brandt.
 45 Anker and Havran pp. 246–47.
 46 The samples were taken by Ola Storsletten, NIKU.
 47 The samples were taken by Ola Storsletten, NIKU.
 48 The samples were taken by Nils Brandt.
 49 The samples were taken by Terje Thun, NTNU University Museum.
 50 Both the pictures and the core samples were taken by Jan Michael Stornes, NIKU.
 51 The samples were taken by Jan Michael Stornes, NIKU.
 52 The sample was taken by Hans Marumrud.
 53 Thun and Storsletten 2011, pp. 45–51.
 54 Christie 2009.
 55 Krogh 2011.
 56 The samples were taken by Jan Michael Stornes, NIKU.
 57 The field work was carried out by Thomas Seip Bartholin, Jan Michael Stornes and Terje Thun.
 58 The sample was taken by Jan Michael Stornes, NIKU.
 59 Hohler 1999 I, p. 240 (Urnes), Hohler 1999 II, pp. 72, 83 (Hopperstad).
 60 The field work at Hopperstad was carried out in September 2011 by Thomas Seip Bartholin, Jan Michael Stornes, Helene Løvstrand Svava, Leif Anker and Terje Thun.
 61 The samples were taken by Terje Thun, NTNU University Museum.
 62 Eckstein 2006.
 63 Godal 1996, pp. 71–72.
 64 Bjerknes 1959, Christie 1959.
 65 Christie 2008, p. 180 onwards. Christie discusses the extent to which physical incursions may have been made to increase the tree's resistance. A number of trees with cracks and different forms of damage in several stave churches have been studied. Nothing has been shown in the growth curves to support this hypothesis. Nor has any documentation been found that confirms that the material was deliberately damaged. Research in this area using test trees would be useful to increase knowledge in this field.
 66 Includes the "Urnes-style church", the predecessor to the extant Urnes stave church.
 67 A large amount of material from standing trees has

been collected from all over Norway with the aim of using the tree rings as proxy-data to reconstruct the summer temperatures back in time. This work is still on-going.

Notes to Chapter 6

- 1 Oddvar Bjørvik 2009, p. 4.
- 2 The Norwegian Directorate of Cultural Heritage 2008, p. 3.
- 3 Fjeldheim 2012 a og b.
- 4 All the reports are listed at the back of the article as unpublished sources.
- 5 Marumrud and Gjelsvik 2010, p. 14.
- 6 Marumrud 2007.
- 7 Marumrud 2007, p. 8.
- 8 Marumrud 2007.
- 9 Marumrud 2010, p. 20.
- 10 Tvenge 2008.
- 11 Tvenge 2009.
- 12 Marumrud and Aamodt 2002.
- 13 Marumrud and Aamodt 2002, p. 7.
- 14 Marumrud and Aamodt 2002, p12.
- 15 Marumrud and Aamodt 2002, pp13–18.
- 16 Rolf 1998, p. 117–225 ff.
- 17 Anker 2015, p. 97.
- 18 Marumrud and Aamodt 2002, p. 28.
- 19 Planke and Jensen 2013.
- 20 Nordrumshaugen 2015.
- 21 Høgseth 1998; 2007.
- 22 Planke 2008, p. 102.
- 23 Nordrumshaugen 2008, p. 61.
- 24 Marumrud unknown year. 2.
- 25 Aamodt and Marumrud unknown year., p. 1, p. 4.
- 26 Marumrud unknown year.1.
- 27 Marumrud 2009.
- 28 Sørumsgård, Godal and Frøstrup. 2008.
- 29 Gunnar Almevik 2012, p. 331.
- 30 Dietrichson 1892. See Anker: chapter 7 and Pedersen: chapter 8.
- 31 I have obtained the phrase «The Greek burden» from the nuclear physicist Kristoffer Gjøtterud.
- 32 The Cultural Heritage Act LOV 1978–06–09–50.
- 33 The Cultural Heritage Act section 1.
- 34 Planke 2015, p. 18–19.
- 35 See Anker: chapter 7.
- 36 Krogh 2011; Christie 2009, pp. 31–160.
- 37 See Planke 2008 for a detailed example of this hypothesis.

- 38 See Pedersen: chapter 8.
- 39 See for example Eskevik 2014, which deals with the relationship between the stave churches and the intangible cultural heritage.
- 40 Schleiermacher in Gadamer 2012, p. 224.
- 41 Planke and Stålegård 2014, pp. 375–382.
- 42 Rolf 1991, p. 141; Planke 2001.
- 43 Rolf 1991.
- 44 Rolf 1991, p. 129 ff.
- 45 Rolf 1991; Polanyi 2000.
- 46 Gadamer 2012, p. 314 ff.
- 47 Gadamer 2012, p. 398
- 48 Gadamer 2012, p. 403 ff.
- 49 Gadamer 2012, p. 411.
- 50 Gadamer 2012, p. 411.
- 51 Gadamer 2012, p. 391
- 52 Gadamer 2012, p. 346 ff.
- 53 Godal 2007; Velure 2007.
- 6 Christie: *Urnes stavkirke (Urnes stave church)*, Oslo 2009; Krogh, *Urnesstilens kirke, (The Urnes-style church)* Oslo 2011.
- 7 Hauglid: “Forord” (“Foreword”) in Bjercknes, *Kaupanger stavkirke, (Kaupanger stave church)* Oslo 1976; cf. also Christie, “Stavkirkeforskningen” (“Stave church research”) in *FMFÅB 1981*, Oslo 1981 (Christie 1981 a).
- 8 Bjercknes: *Kaupanger stavkirke (Kaupanger stave church)*, Oslo 1976; (English edition. Bjercknes and Lidén: *The Stave Churches of Kaupanger*, Oslo 1976 with additional chapter on the archaeological investigations); Christie: *Nes stavkirke/The Stave Church of Nes*, Oslo 1979; Jensenius, *Lomen stavkirke. En matematisk analyse / The Stave Church of Lomen. A mathematical Analysis*, Oslo 1988.
- 9 Christie 1981 a; d.s.: “Lorentz Dietrichson og stavkirkeforskningen” (“Lorentz Dietrichson and stave church research”) in *Kunst og Kultur (Art and Culture)* 3, 1981, pp. 160–172 (Christie 1981 b); Qvale: *Lorentz Dietrichsons verk om “De Norske Stavkirker” og dets plass i norsk forskningshistorie*, (Lorentz Dietrichson’s work on “The Norwegian stave churches” and its place in Norwegian research history) unpubl. MA. dissertation. University of Bergen 1990; and “Stavkirkeproblemet i forskningshistorisk belysning” (“The stave church problem in the light of research history”) in *Kunst og Kultur (Art and Culture)* 2, 1993, pp. 66–88; Jensenius: “Lorentz Dietrichsons ‘De norske stavkirker’ – en klassiker” (“Lorentz Dietrichson’s ‘The Norwegian stave churches – a classic’) in *Viking* LXIX, 2006, pp. 275–288. Christie and Jensenius worked on the research programme and the series Norway’s Churches, firstly at the Directorate of Cultural Heritage, and later at the Norwegian Institute for Cultural Heritage Research – NIKU.

Notes to Chapter 7

- 1 Thanks to Lena Liepe, Ole Egil Eide, Ulf Holmene, Knud J. Krogh and Elin Anker, and my colleagues at the Directorate of Cultural Heritage, two anonymous experts and to the editorial team for their comments on this chapter. I am grateful to Jørgen H. Jensenius for bringing my attention to significant history and methodological problems; and to Knud J. Krogh for valuable and stimulating conversations about stave church research.
- 2 The major work in this context is *De norske stavkirker (The Norwegian stave churches)*, Kristiania 1892.
- 3 H.M. Schirmer wrote a number of articles about stave churches, medieval churches and associated subjects in *FMFÅB* from 1899 to 1910. The most influential of these articles are “Vore ældste kirkebygninger og videre frem” (“Our oldest churches and onwards”), *FMFÅB 1902* and *FMFÅB 1903* Kristiania, 1903 og 1904; “Dragehoveder” (“Dragon heads”), *FMFÅB 1905*, Kristiania 1906; “Horg og hov” (“Sanctuaries and temples”, *FMFÅB 1906*, Kristiania 1907; “Fra hedensk og kristen tid”, (“From heathen and Christian times”) *FMFÅB 1910*, Kristiania 1911.
- 4 Lidén: *Nicolay Nicolaysen. Et blad av norsk kulturminneverns historie (Nicolay Nicolaysen. A page from the history of Norwegian cultural heritage)*, Oslo 2005, p. 49.
- 5 Hohler: *Norwegian Stave Church Sculpture I–II*, Oslo 1999. The research history of stave church carvings is covered extensively in vol. II, pp. 9–38.
- 10 E.B. Hohler 1999 II.
- 11 McNicol: *Plassering av de første kirkene i Norge i forhold til de første kultstedene. En historiografisk studie omfattende tiden etter 1830*, (The location of the first churches in Norway in relation to the first cult sites. A historiographic study covering the period after 1830) KULT’s monographs no. 98, Oslo 1997.
- 12 Qvale 1990.
- 13 Lidén: *Fra antikviteten til kulturminne: trekk av kulturminnevernets historie i Norge*, (From antiquity to cultural heritage: trends in cultural history research in Norway) 1991; Lidén 2005; and on the post-war generation and medieval churches in “Studier av norsk kirkearkitektur. En forskningshistorisk oversikt”

- (“Studies of Norwegian church architecture. An overview of research history”) in M. Rindal (Ed.), *Studier i kilder til vikingtid og nordisk middelalder*, (Studies of sources of the Viking age and the Norwegian Middle Ages), KULT’s monographs no. 46, Oslo 1996.
- 14 McNicol 1997, p. 77
- 15 It is interesting that the excavations at Urnes and the comprehensive discussion of this are not mentioned in Johannessen and Eriksson (Ed.): *Faglig program for middelalderarkeologi*, (Academic programme for medieval archaeology) 2015, nor in the bibliography.
- 16 *Samlinger til det norske Folks Sprog og Historie*, (Collections of the Norwegian people’s language and history) Christiania 1834. See also Bugge: “Kunstnere og kirkeprospekter” (The artists and views of the churches”) in *FMFÅB 1929*, Oslo 1930. Bugge offers an overview and discussion of the sketches and descriptions of stave churches before 1840. Gerhard Schønning’s travel descriptions from the 1770s are also an important source of material about lost stave churches. However, this did not lead to any immediate systematic registration or publications dealing with stave churches specifically.
- 17 Dahl 1837. Bugge (1929, p. 42) writes that Rumohr helped Dahl to edit the text. Willoch: “Martinus Rørbye eller Knud Baade. Hvem malte Borgund stavkirke” “Martinus Rørbye or Knud Baade. Who painted Borgund stave church?”) in *Kunst og Kultur* (Art and Culture) (1989: 113 f) refers to a meeting between the Danish painter Martinus Rørbye and Dahl in Dresden in 1835, where Dahl allegedly talked incessantly about stave churches.
- 18 Fantoft stave church burnt down in 1993. Garmo was reconstructed and erected at Lillehammer in 1919 using elements that had allegedly come from the demolished church. Øye was reconstructed in 1965 (see Anker 2005 with references). Today the number of surviving stave churches is given as 28. The counting method could be discussed with good reason, but the number is well-established in both the literature and in the public eye and after all, there does have to be a number.
- 19 Lidén 2005, p. 46.
- 20 Flintoe’s drawings of Heddal showed the exterior and the ground plan, and Schiertz’s lithographs for Dahl’s book also contained interiors and portals. The building construction is neither illustrated nor described. These measurements were very brief by today’s standards and only cover what the architect deemed to be the medieval elements of the buildings. The buildings are seen as symmetrical on the longitudinal axis, without any lop-sidedness and the drawings do not show joints, the quality of craftsmanship or unevenness in the way the wood was worked, see Lidén 1991, p. 40, and Jensenius: “Prosjektering av trekirker i norsk vikingtid og middelalder” (“Project work on wooden churches in the Norwegian Viking era and the Middle Ages”) in *Viking*, vol. 73, 2010, p.159 f.
- 21 Nicolaysen 1855, “Hurums og Lomens Kirker i Valdres” “Hurum and Lomen Churches in Valdres”) and “Om hov og stavkirker” (“On temples and stave churches”) in (Norwegian) *Historisk Tidsskrift* (H.T.) 1888, pp. 301–305.
- 22 Nicolaysen 1888, pp. 264–305.
- 23 See section below *The pagan temple is written off – for good?*
- 24 Nicolaysen dated the church to the first part of the 1000s cf. Dietrichson 1892:162. The dating of the church has changed over the years. Timber in the church has been dated by dendrochronology to ca. 1063–1100, Tyers 1996; see also Gardiner 2015.
- 25 Nicolaysen 1888, p. 291 ff. Nicolaysen does not discuss urban churches, their number or their construction methods. He deduces that in 1854 there were 175 stone churches and 49 stave churches. 41 stone churches were known to have been demolished, and 155 of timber framework (incl. stave churches) and one log church. In total Nicolaysen reckons that the construction methods are known for 197 demolished churches.
- 26 Ibid., p. 295 ff.
- 27 Ibid., p. 299 f.
- 28 Ibid., p. 303.
- 29 Ibid., p. 304 f.
- 30 Dietrichson 1892: *Den norske treskjererkunst*, 1878; “Om Ornamentikken i de norske Stavkirker” (The Norwegian art of woodcarving 1878: “On ornamentation in the Norwegian stave churches”) in *Tidsskrift for Kunstindustri 1887*, p. 97–122; *En sammenliknende fortegnelse over Norges Kirkebygninger i Middelalderen og Nutiden I–III*, 1888. (A comparison of Norwegian church buildings in the Middle Ages and the present day I–III) 1888
- 31 Dietrichson 1892: VII.
- 32 Bendixen “Undredal kirke i Sogn”, (“Undredal church in Sogn”) *FMFÅB 1902*, Kristiania 1903, p. 202–205; Kielland: “Undersøgelser ved Urnæs, Undredal, Gaupne og Røldal kirker, samt iakttagelser paa en reise

- gjennom Valdres”, (“Investigations at Urnes, Undredal, Gaupne and Røldal churches, and comments on a journey through Valdres”) *FMFÅB 1902*, Kristiania 1903, p. 158–205.
- 33 Dietrichson 1892, p. 225.
- 34 Dietrichson dates Nore stave church (with centre post) for example on a typological basis to the “decline of the Gothic” around 1250, (p. 184, 384 f.) while the church’s west portal according to Dietrichson’s grouping and chronology indicates a much earlier dating, cf. his dating of the portals in Atrå and Tuft to pre-1200 (p. 242, 365 f.) See Jensenius 2006, p. 281 on Dietrichson’s circle of proof.
- 35 Dietrichson 1892, p. 175.
- 36 Dietrichson 1892, p. 35 ff.
- 37 Jensenius 2006, p. 284 f. for further discussion.
- 38 “This apparently complete picture has to some extent hypnotized later scholars”, Hohler 1999 II, p. 16.
- 39 Jensenius 2006: p. 275.
- 40 Dietrichson 1892: p. 165; see also p. 176 for Dietrichson’s comparison of the stave churches and “our ancient people’s physiognomy”; cf. Qvale 1990: p. 71 ff.; McNicol 1997, p. 87 f.
- 41 Dag Sveen 2004, p. 21 f., 104 f., 158–165 “Forestillingen om den norske bondes særegne talent for treskjæring” (“The idea of the Norwegian’s peasant’s special talent for woodcarving”).
- 42 McNicol 1997 gives a thorough survey of the comprehensive, long-lasting and very airy debate (by modern standards) about the pagan temple and the stave churches. The discussion was first (provisionally?) shelved with Olaf Olsen’s dissertation in 1965 (Olsen: Pagan site, temple and stave church 1965), see also Olsen 1995, p. 127. Lidén regards the question as having been answered in Lidén 2005, p. 246 note 63; see also the section below *The pagan temple is written off—for good?*.
- 43 See Hohler 1999 II for a discussion of the portal research.
- 44 Blix (1895), Meyer (1925), Ree (1935), Krogh (1974), Christie (1981 a, b, c); and Jensenius (2006) have all criticised Dietrichson for confusing architectural and constructional analysis with style analysis.
- 45 Krogh, (review of): “L. Dietrichson, De norske stavkirker” (“L. Dietrichson, the Norwegian stave churches”) in *Medieval Scandinavia* 7, 1974, p. 244: “Today we must admit that the existing buildings are so diverse in form, and comprise such a small sample of the original number, that great caution is needed in any attempt to generalize concerning Norwegian stave-churches.”; Anker: “Om dateringsproblemet i stavkirkeforskningen” (“On the problem of dating in stave church research”) in *Historisk tidsskrift* 2, 1977, Oslo 1977, p. 103–142 (123 f.): The rich variety of typology in the small number of surviving stave churches (...) should indicate that care is needed when establishing a chronological relationship between the types – a parallel development of many types is one possibility that cannot be rejected out of hand (...).”
- 46 Blix: *Nogle undersøgelser i Borgund og Urnæs kirker med nogle bemærkninger vedkommende Hopperstadkirken og om en del udtalelser i Dietrichsons “De norske stavkirker”* (“Some investigations at Borgund and Urnes stave churches with some comments concerning the Hopperstad church and some remarks in Dietrichson’s “The Norwegian stave churches”). Kristiania 1895. In the Society for the Preservation of Ancient Norwegian Monuments (FTMF)’s year books at the start of the twentieth century there was a series of articles with shorter and longer descriptions of a number of stave churches.
- 47 Blix’ restoration of Hopperstad 1885–1891 has not yet been critically investigated or explained in detail. The work can be traced through reports from Blix to Nicolaysen, and Blix’s drawings. Part of the material is available in the antiquarian archive at the Directorate of Cultural Heritage, top.no. A-291 Hopperstad stavkirke “Arkivalia”
- 48 Schirmer 1906: p. 81 ff.
- 49 These are a portal fragment from Torpo, two parts of a corner stave from Hopperstad and two cut portal planks from Bjølstad. The archaeologist Haakon Shetelig defined and gave the Urnes style its designation in his fundamental article “Urnes-gruppen” (“The Urnes group”) in *FMFÅB 1909*, pp. 75–107 (1910). Until then the designation was more fluid. Dietrichson (1892) describes the Urnes style as partly Irish (Celtic), Irish-Swedish, Irish-Norwegian, the Irish group and as the Urnes group (see p. 182, 212, 225, 226). He was followed by Schirmer (e.g. *FMFÅB 1900*, s. 102) but with slightly fewer variants.
- 50 Schirmer 1910, p. 99 f., 115 ff.
- 51 “When for example the Urnes portal is still at times represented as an example of the old heathen beliefs in the ornamented world of Christianity, this is a real falsification of history.” Fuglesang 2003, p. 42. Schirmer was followed by Harry Fett *Norges kirker i middelalderen* (Norway’s churches in the Middle Ages) 1909, p. 5, 9. Roar Hauglid discusses the Urnes carvings and

- the portal as “an expression of heathen animal ornamentation”, “Urnes stavkirke” (“Urnes stave church”) in *FMFÅB* 1969, p. 34 and as “heathen carvings” in *Norske stavkirker. Bygningshistorisk bakgrunn og utvikling*, (Norwegian stave churches. Building history background and development) 1976, p. 402.
- 52 Schirmer 1903, p. 38 postulates without reservations that the “building’s construction shows their development history and his [Kielland’s] proof is so clear and enlightening that it is self-confirming”. Kielland *FMFÅB* 1902, p. 195 had some reservations and said that this should be investigated in more depth in order to be able to conclude whether the double horizontal connecting beam and the diagonal crosses at Hopperstad were secondary or original, see the section on *Building processes and building constructions – new views* below.
- 53 Schirmer’s easily-comprehensible schematic depiction of churches with interior posts avbinding is presented in a number of publications see e.g. Bugge 1935, 1953, Hauglid 1969, 1973, 1976; Bjercknes: “Stavkirke” (“Stave churches”) in Hødnebo (Ed.): *Kulturhistorisk Leksikon for Nordisk Middelalder*, (Cultural history lexicon for the Nordic Middle Ages) vol. 17, 1972.
- 54 Ekhoﬀ: *Svenska stavkyrkor*, (Swedish stave churches) Stockholm 1914–16. Some of the material is from areas that became part of Sweden after the Middle Ages. Ekhoﬀ discusses various possible interpretations of the Norwegian material and he notes a clearer source criticism and more detailed use of typology as a dating criterion. Ekhoﬀ also suggest a common Scandinavian terminology within stave church research.
- 55 *Ibid.*, p. 361 ff.
- 56 *Ibid.*, p. 127 f., p. 366. The dating of Hemse has been discussed partly on building typology grounds and partly on style-history grounds. The materials in the church date to some time after 1098–1103 (Ahrens 2001 Catalogue, p. 237).
- 57 Lindqvist “Hädnatemplet i Uppsala” (“The heathen temple in Uppsala”) in *Fornvännen* 18, 1923, p. 98.
- 58 *Ibid.* 104 f., p. 110.
- 59 See Schirmer 1903 (1904), p. 38, Bjercknes 1940 (1942); Christie: “Stavkirker” (“Stave churches”) in Berg et al. (Ed.): *Norges kunsthistorie* (The history of art in Norway) vol. I, Oslo 1981 (Christie 1981 c).
- 60 Ree: *Stavbygg. Basilika – Stavkirke*, (Stave constructions. Basilica – Stave church) 1935. “The aim of this book is to show how erroneous and misleading this axiom is [i.e. the inner staves in the churches with interior posts resembling a basilical]” (p. 13). The book provides a fiery and sometimes colourful depiction of this discussion and not least how deep this could go.
- 61 Meyer: “Kirker og klostre i middelalderen” (“Churches and monasteries in the Middle Ages”) in H. Aars et al. (Ed.): *Norges Kunsthistorie I*, (The history of art in Norway vol. I) 1925, p. 115–196. Meyer was an architect and professor of architectural history at the Norwegian Institute of Technology (NTH).
- 62 *Ibid.*, p. 128 ff.
- 63 *Ibid.*, p. 122 ff.
- 64 *Ibid.*, p. 124.
- 65 Hohler 1999 II, p. 21.
- 66 Hohler 1999 II, p. 17. Hohler emphasised this after the war but there is little doubt that this also applied earlier, albeit on a smaller scale.
- 67 Mowinckel: “De eldste norske stavkirker” (“The oldest Norwegian stave churches”) in *Universitetets Oldsaksamling skrifter II* (Monographs of the University’s collection of antiquities II), 1929, pp. 383–424.
- 68 Boëthius 1931.
- 69 *Ibid.*, p. 110.
- 70 *Ibid.*, p. 127 italicised here.
- 71 *Ibid.*, p. 129 italicised here.
- 72 *Ibid.*, p. 127 ff. Boëthius groups a number of churches with centre posts that clearly conflicts with his typological scheme. For example, Borgund is in the same group as Årdal (p. 128), Stedje is grouped with Kaupanger, Ringebu etc. (p. 107). Haltdalen/Holtålen stave church is described as “Åhl”; Ål stave church is confused with Torpo. (p. 159). Based on the context it is reasonable to see this as a mixing up of names and not as an inconsistent group distribution.
- 73 *Ibid.*, p. 129. In Swedish: “*mättad av tradition och byggestil, men samtidigt känsligt vaken för nya stilskiftens skönhetsvärden*”. My translation.
- 74 “*Då nogon plan av en stavkyrka från 1000-talet ännu ej är känd från det medeltida Sverige och alla rekonstruktionsförsök äro hypoteser, kan frågan om deras planlösning och art ej upptagas här*” (my italics), (“*Since no plan is hitherto known of any stave church from 11th century in medieval Sweden and all attempts for reconstruction will be hypothetical, the question on their plan and characteristics can not be dealt with here*” – my italics). Boëthius 1934, p. 4. With “medieval Sweden” Boëthius has literally kept her words, as in the 1000s Gotland was not part of Sweden, Skåne was Danish and the stave church in Hedared was dated to the Late Middle Ages by Ekhoﬀ.

- 75 Bugge 1934, p. 191
- 76 Ibid., p. 192.
- 77 Bugge 1938; and *Norske stavkirker* (Norwegian stave churches), Oslo 1953. Bugge also discussed individual churches and portals in a number of local history articles. The preliminary works for a planned major stave church book can be found in an unpublished manuscript in the library of the Directorate of Cultural Heritage.
- 78 Hauglid: "Setesdalens stavkirkeportaler. En studie i portalornamentikkens historie" ("Setesdalen's stave church portals. A study of the history of portal ornamentation") *Univ. Oldsakssaml. Årbok 1937*, pp. 65–136. See Hohler 1999 for further discussion of portal research.
- 79 Bjercknes 1940 (1942).
- 80 Bjercknes 1944 (1946). The stave church at Fantoft was moved from Fortun in Sogn in the 1880s. In the literature, the church is described *before* it was moved as Fortun. The restored, *re-erected* church is referred to as Fantoft. This also corresponds with the Directorate of Cultural Heritage's system in the topographical archives.
- 81 Ibid., p. 28 ff. Views and concepts are completely in line with the functionalists' view of architecture cf. Qvale 1990.
- 82 Ibid., p. 38.
- 83 Reiher: *Norwegische Stabkirchen. Meisterwerke germanischer Holzarchitektur*, Deutsche Zeitung in Norwegen Verlag, without year (1943). (Norwegian stave churches. Masterpieces of Germanic wooden architecture, German Newspaper in Norway Publishing).
- 84 Pringle: *The Master plan. Himmeler's scholars and the holocaust*, 2006: 41, 50 f. Ahnenerbe was established in 1935; from 1939 as part of Allgemeine SS. For Ahnenerbe in Norge, see Arisholm and Emberland: "Kollaborasjon om kulturminner" ("Collaboration and cultural heritage") *FMFÅB 2012:81*; M. Garsche "Norge og prosjektet Gemanische Wissenschaftseinsatz" in Emberland and Fure (Eds.): *Jakten på Germania*, 2009 (The hunt for Germania), p. 214. Garsche refers to Hermann Phleps as Hans Phelps. From the context this is a clear misspelling and not a mixing up of persons. Hermann Phleps was from Siebenbürgen/Transylvania, which became part of Romania after the dissolution of the double monarchy of Austro-Hungary after the First World War. Phleps studied at the technical university in what was Danzig (now Gdansk) and after the Second World War became professor at the University of Marburg a.d. Lahn (BRD).
- 85 Phleps: *Die Norwegische Stabkirchen. Sprache und Deutung der Gefüge*, Karlsruhe 1958. Phleps does not consider the connection for the collection work apart from many drawings and notes being lost in the war. The book was reviewed by Håkon Christie in *Meddelelser fra Kunsthistorisk forening*. (Reports from the Art History Society), issue III, volume 4, March 1965.
- 86 Mårtensson: "Stavkyrkor i Lund" ("Stave churches in Lund") in *hikuin* 9, 1983, p. 148 f.
- 87 Møller and Olsen: "Danske trækirker" ("Danish wooden churches") in *Nationalmuseets Arbejdsmark* 1961, pp. 35–58; Krogh and Voss: "Fra hedenskab til kristendom i Hørning", ("From heathendom to Christianity in Hørning") *Ibid.*, pp. 5–34. For the major finds in Lund, see Mårtensson 1983 and Mårtensson(Ed.): *Uppgrävt förflutet för Pkbanken i Lund*, Lund 1976 w/references. Catalogue in Ahrens (Ed.): *Frühe Holzkirchen im nördlichen Europa*. (Mit Beiträgen), Hamburg 1981; and *Die frühen Holzkirchen Europas I–II*, Stuttgart 2001.
- 88 Eliassen i *FMFÅB 1931*, s. 51–58; Tverdahl: *Grip Rapport May 1936*, A-336 Grip stave church, AA, RA.
- 89 A short description of the proposed restoration for Høyjord is published in *FMFÅB 1949*, s. 61. The result is published in *FMFÅB 1950*, p. 100 and 1951/52, p. 146. Heddal proposed restoration *FMFÅB 1950*: p. 102. Completed restoration in *FMFÅB 1956*, pp. 1–24.
- 90 Lidén has pointed to the turn towards documentation and building archaeology in church research among the younger generation who became involved after the war. This also applies to the stave churches, but to a much lesser extent than the stone churches. For the research history of stone churches, see Trædal: *Norske steinkirker fra middelalderen – en forskningshistorie* (Norwegian stone churches from the Middle Ages – a research history), unpubl. dissertation, University of Bergen 1998.
- 91 Bjercknes: "Urnes stavkirke. Har det vært to bygninger forut for den nuværende kirke?". ("Urnes stave church. Were there two buildings prior to the current church?") *FMFÅB 1958*, Oslo 1959, pp. 75–96 (Bjercknes 1958); Christie "Urnes stavkirkes forløper. Belyst ved utgravninger under kirken" ("Urnes stave church's predecessors in the light of excavations beneath the church") in *FMFÅB 1958*, Oslo 1959, pp. 49–74 (Christie 1958).

- 92 Krogh: “Kirkerne på Urnes” (“The churches at Urnes”) in *Aarvog for Nordisk Oldkyndighed og Historie*, 1971, pp. 146–194.
- 93 Ibid., p. 170.
- 94 Christie: “Stavkirker. Arkitektur” (“Stave churches. Architecture”) in Berg et al. (Ed.): *Norges kunsthistorie* (The art history of Norway) volume 1 1981 (Christie 1981 c), p. 197.
- 95 Krogh and Voss: “Fra hedenskab til kristendom i Hørning”, (“From heathendom to Christianity in Hørning”, *Nationalmuseets Arbejdsmark* 1961, p. 18 f.
- 96 Jensenius 2001 with an overview of excavations and a discussion of earlier wooden church constructions in Norway.
- 97 Mårtensson: “Stavkyrkor i Lund” (“Stave churches in Lund”) *Hikuin* 9, Højbjerg 1983, pp. 143–162.
- 98 Olsen 1966. Olsen killed off the temple but used the pagan site as a possible starting point for the construction of churches with interior posts. The source for this is possibly even weaker than the temples that he tore apart. In connection with the strong source critical approach in his dissertation, the hypothesis appears almost as an *ad hoc* appendage, a concession to the fixed opinions about cult building continuity at that time. Olsen 1995: p. 127 goes a long way to distance himself from his hypothesis on the pagan site-stave church. See also McNicol 1997, Lidén 2005, cf. note 42 above.
- 99 Lidén: “From Pagan Sanctuary to Christian Church. The Excavation of Mære Church in Trøndelag” in *Norwegian Archaeological Review* vol. 2, 1969, pp. 3–32; and “Undersøkelsene i Mære kirke” (“Investigations in Mære Church”) in Hoff and Hommedal (Eds.): *En gullgubbe. Festskrift til Hans-Emil Lidén*, (A golden amulet: Festschrift for Hans-Emil Lidén) Øvre Ervik 1999, pp. 1–64.
- 100 Olsen 1995, p. 127; Lidén 2005, p. 246 note 63
- 101 Larsson and Lenntorp: “The enigmatic house” in Larsson (Ed.): *Continuity for Centuries. A Ceremonial Building and Its Context at Uppåkra, Southern Sweden. Uppåkrastudier* 10, 2004.
- 102 Uppåkra and the resurrected speculations about stave churches and temples is a good example of the power of attraction that lies in a possible encounter with heathendom. Characteristic of this is T. Gansum in “Hallene og stavkirkene. Kultbygninger i en overgangstid” (“Halls and stave churches. Cult buildings in a time of transition” in Chilidis et al (Ed.): *Facets of Archeology*, Oslo 2008, p. 206, where Gansum defends the stave churches as the hall’s architectural successors without really bringing in any new factors to an old discussion. He regards Lindqvist’s interpretations of Uppsala as “visionary” indeed without these being shared by today’s scholars: “But I find his idea very attractive.”
- 103 Binding: “Holzkirchen in Rhein-Maas-Gebiet” in Ahrens (Ed.): *Frühe Holzkirchen im nördlichen Europa*, Hamburg 1981, p. 268
- 104 Blindheim: *Norwegian Romanesque Decorative Sculpture 1090–1210*, London 1965.
- 105 Anker: *L’Art Scandinave I*, La-Pierre-qui-Vire 1969, Eng. edition. *The Art of Scandinavia I*, London 1970.
- 106 For an exposition of portal research, see the section on Sculpture below.
- 107 Anker 1970, pp. 415–418.
- 108 Ibid., p. 390.
- 109 Boëthius 1934 points out that the tradition of building churches in stone is the most significant factor in the shift in material from wood to stone, In Norway the relationship between wood and stone was first discussed briefly by S. and H. Christie. *Norges kirker. Østfold I–II*, 1959 (Norway’s churches. Østfold I–II) and in more depth in *Norges kirker. Akershus I–II*, (Norway’s churches. Akershus I–II) 1969. The relationship is discussed in more detail in a wider historical context in Anker 1969, 1970. Socio-economic theories are also central in post-war sociological research (Solholm 1959) which take as its starting point agrarian-historical research (Holmsen and Bjørkvik 1952–54, 1978).
- 110 Holmsen and Bjørkvik: “Kven ätte jorda” (“Who owns the earth”) 1952–54, combined edition. 1972. The distinction between stave and stone in S. and H. Christie 1959, 1969; Anker 1969, 1969 b (KLN), 1970; Anker 1997 (p. 208 ff.) omits canonical requirements for building materials with reference to more recent research. See also Hohler 1999 II, p. 22; Wienberg 1999 discusses Swedish issues, see p. 98 on dichotomies in the views of wood-stone.
- 111 Lidén 1986, p. 93, 1987; p. 7 ff. Lidén goes far in emphasising the building material as a marker for deep-lying sociological conditions. Less substantial in S. and H. Christie 1982, 1993, pp. 54–57.
- 112 Lidén 1981, 1986, 1987, Ekroll 1997, pp. 32–36.
- 113 Anker 2005, p. 87 ff., 96 with references.
- 114 Jensenius: “Var det krav om høye stenkirker i middelalderen?” (“Was there a requirement for tall stone churches in the Middle Ages?”) *Viking* 1997, Oslo 1997: 88

- 115 Hauglid: *Norske stavkirker. Dekor og utstyr* (Norwegian stave churches. Decoration and inventory) Oslo 1973, *Norske stavkirker. Bygningshistorisk bakgrunn og utvikling*, (Norwegian stave churches. Building history background and development) Oslo 1976.
- 116 Andersson: "Recension (reviewed by Hauglid 1973), *Fornvännen* 1975, pp. 45–46. Response from Hauglid: "Kritikk av kritikken" ("Criticism of the criticism") in *Fornvännen* 1975, pp. 245–247; reply from Andersson: "Genmäle", *Fornvännen* 1975, pp. 247–248; Anker "Dateringsproblemet i stavkirkeforskningen" ("Dating problems in stave church research") (reviewed by Hauglid 1973)", (Norwegian) *Historisk tidsskrift* 1977, pp. 103–142; response from Hauglid: "Om dateringsproblemet i stavkirkeforskningen" ("On dating problems in stave church research") in *Historisk tidsskrift* 1977, pp. 433–432; reply from Anker: "Stavkirkenes datering" ("Stave church dating) " H.T. 1978, pp. 216–218.
- 117 Hauglid 1976, p. 110 f.
- 118 Binding: "Niederrheinische Holzkirchen auf Schwelbalken" in *Bonner Jahrbücher* 170, 1970, pp. 279–288.
- 119 Hauglid 1976, p. 58, p. 399 ff. The Husterknupp house is central to Hauglid's development hypothesis and has 15 entries in total.
- 120 Hauglid 1976, p. 75 f.
- 121 Hauglid 1973, pp. 67–82. See also Hohler 1999 II, p. 19, 70 ff.
- 122 Langberg: *Stavkirker. En hilsen til Norge i anledning af rigsjubileet 872–1972*, (A greeting to Norway on the occasion of the national jubilee 872–1972) Copenhagen 1972, p. 33 ff.
- 123 *Ibid.*, especially p. 34 f.
- 124 Anker (1977). In his subsequent works (1979 and 1997) these perspectives are toned down. Christie (1981 c) also refers to Langberg's methodological warning about the weak traces that sill constructions leave in the ground. Andersson (1975) also notes the same with reference to Langberg in the review of Hauglid 1973.
- 125 Christie's writings about stave churches extend from the article on the excavations at Urnes in *FM-FÅB* 1958 to the book *Urnes stavkirke* (Urnes stave church) 2009. In between are major overview articles in books, articles on church archaeology, chapters on stave churches in the county volumes in *Norges Kirker* (Norway's Churches), smaller publications on individual buildings and subject-specific works, see Bakken: "Håkon Christies bibliografi" ("Håkon Christie's bibliography") in Berg et al. (Ed.): *Kirkearkeologi og kirkekunst*, (Church archaeology and church art) 1993. Christie's review of H. Phleps (1958) i *Meddelelser fra Kunsthistorisk forening 1965* (Reports from the Art History Society 1965) express a view on the main elements of stave church architecture, to which he has for the most part continued to adhere. As Qvale 1990, p. 204 note 57, notes, Christie's views (1965) have much in common with Phleps', including the methodological approaches, it could be added. However it must be strongly emphasised that Christie made express reservations against Phleps' designations which have strong indications of the terminology of the Nazi era.
- 126 Christie 1981 c, cf. Christie 1965, 1970, 1993.
- 127 Christie 1981 c, p. 185, 209
- 128 *Ibid.*, pp. 179–185.
- 129 *Ibid.*, p. 174 with reference.
- 130 *Ibid.*, p. 206 f. Christie is very equivocal on this point. From the context he must be understood to mean "temple building" when he discusses "temples". On p. 206 he refers to Olsen (1966), but continues in the next section to use "temple" as a separate building. The Mære finds are commented on p. 207 with "getting warmer".
- 131 *Ibid.*, p. 207, 243 f., cf. Christie 1981b, p. 61, Bjercknes 1944, Boëthius 1931, Meyer 1925.
- 132 Christie 1981a, p. 210 f. Here he follows and builds on Bjercknes 1944, cf. Bjercknes 1976, p. 83. It is possible that Bjercknes is building on Boëthius 1931 (p. 109) where she defends this subsequent to Lindqvist (1923), see also note 54. Boëthius also says that the chancel construction with a central stave area refers back to a pre-Christian type of building. Her starting point was what she called craftsmanship. This is the same approach as Meyer 1925. Neither of them discusses how craft techniques were applied or the details, cf. Planke, chapter 5 in this book. From the context it seems that both Meyer and Boëthius used the term "craftsmanship" in the sense of "building construction methods". Phleps (1958) also seems to use this term in this way.
- 133 Christie 1981c, pp. 212–216.
- 134 Hohler 1981, p. 280 ff. dates the Atrå-group's portals with Nore's west portal to the last half of the 1100s and at about the same time as the arrival of the Gothic in Trondheim in about 1180. Tree ring samples for three staves at Nore date to 1167/1168, see Thun et al, chapter 5 in this book.

- 135 Christie 1981c; and 2009
- 136 Myhre: “Synspunkter på huskonstruksjon i sørvestnorske gårdshus fra jernalder og middelalder” (“Views on the construction of farmhouses in southwest Norway from the Iron Age and the Middle Ages”) B. Stoklund et al (Ed.) *Vestnordisk byggeskikk gjennom to tusen år*, (Building traditions in western Norway over two thousand years), the Archaeological Museum Stavanger publications no 7, 1982, p. 116. The article was a contribution to a seminar. Christie himself spoke about the stave churches at this seminar: “Stavkirken som tradisjonsbærere og fornyere i middelalderens norske bygningsmiljø” (“Stave churches as bearers of traditions and innovators in medieval Norwegian construction environments”), published together with Myhre’s contribution.
- 137 Krogh 2011, p. 199.
- 138 Krogh 1983, p. 94; Mårtensson: “Stavkyrkor i Lund” (“Stave churches in Lund”) *Hikuin 9*, Højbjerg 1983, p. 159
- 139 Christie 2009, p. 28.
- 140 Jensenius 1988 a, 1988 b, 1993.
- 141 Jensenius: *Trekirkene før stavkirkene. En undersøkelse av planlegging og design av kirker før ca år 1100*, (Wooden churches before the stave churches. A study of planning and design of churches prior to around 1100) Con-text Dissertation 6, The Oslo School of Architecture and Design 2001.
- 142 This could possibly be due to some extent to a form that is not easily accessible (Lomen) and that the conclusions were not discussed in the light of similar investigations in international subject literature. At the same time it is obvious that Jensenius’ views and subject-critical approach did not correspond well with established opinions in parts of the research environment.
- 143 Jensenius 2001; also “Røldal – stavkirke eller ...?” (“Røldal – stave church or ...?”) *Viking 1998*, pp. 131–145; “Staver som brytes og kirker som faller. Vedlikehold og rivning av kirker i middelalderen”, (“Staves that break and churches that collapse. Maintenance and demolition of churches in the Middle Ages”) *Kirke og Kultur*, (Church and Culture) no. 5/2007, pp. 418–429; “Wooden Churches in Viking and Medieval Norway: Two Geometric and Static Strategies”, Evgeny Khodakovsky and Siri Skjold Lexau (Eds.): *Historic wooden architecture in Europe and Russia: evidence, study and restoration*, Basel 2015, pp. 20–27.
- 144 See also Krogh 2011, p. 200.
- 145 Jensenius 2010; Stylegar 2001, p. 132.
- 146 Jensenius 1998: 144; Jensenius 2010, p. 166.
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- 148 Storsletten: *Takene taler. Norske takstoler 1100–1350 klassifisering og opprinnelse I–II*. (The roofs speak. Norwegian roofs 1100–1350 classification and origins I–II) Con-text Dissertation 10, The Oslo School of Architecture and Design, 2002.
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- 154 Lidén 1997, Christie and Christie: *Norges Kirker. Buskerud I–III* (Norway’s churches. Buskerud I–III)
- 155 Lidén 1991, 1996, 2005; McNicol 1997; Qvale 1990; Trædal 1998; Hohler 1999; Jensenius 2006.
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- 158 Anker 2015.
- 159 Marumsrud and Aamodt: *Nore og Uvdal stavkirker. Tømmerkvaliteter og materialframstilling* (Nore and Ulvdal stave churches. Timber quality and working the materials) Unpubl. Report 2002, Antiquarian archives of the Directorate of Cultural Heritage. Commented on in Anker 2015, p. 96. At present there is no collective discussion of the use of materials in the stave churches. See also Planke: chapter 5.
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- 162 Christie: *Urnes stavkirke* (Urnes stave church), 2009, Krogh: *Urnesstilens kirke* (The Urnes-style church), 2011
- 163 Krogh 2011, pp. 181–210.
- 164 Blindheim 1965.
- 165 Boëthius 1931, p. 143 refers to the Monk’s doorway in Ely cathedral, as does Zarnecki in *Early Sculpture of Ely*, 1958, p. 33, but he uses the Ulvik portal as an example. The Ulvik portal is regarded as a “twin” to Hopperstad’s west portal. Zarnecki also refers to the Prior’s doorway at Ely. See Hohler 1999 II, p. 19. Hohler also refers to an important moment in research history, the international art and architectural history literature became richer and better-illustrated throughout the 1900s.
- 166 For a detailed overview see Hohler 1999 II, p. 19 ff.
- 167 Ibid.; Dietrichson 1892; Bugge 1953; Blindheim 1965; Hauglid 1973; Anker 1970, 1976, 1977, 1997; Hohler 1971–72, 1975, 1981, 1993, 1999. Fuglesang 2004 with references.
- 168 Hohler 1982, 1993, 1999 I–II with references. Further discussion of the Hylestad group in Hohler 1972, for Urnes’ Romanesque dressed timber see Hohler 1975.
- 169 Anker 2005, p. 60.
- 170 Hohler 1999 II, p. 94 ff.
- 171 Ibid., pp. 29–34.
- 172 Krogh 2011, p. 187 ff.
- 173 Fuglesang 2004, p. 204 stresses the difference between wall a frieze and a portal as architectural decoration, but is in line with the dominant views of continuity from Urnes to the first so-called Sogn-Valdres portals.
- 174 For the most recent research overviews and the different interpretations, see Hohler 1995 and 1999 II, pp. 22–25; Pedersen 1997, pp. 2–7, 125–128; more briefly in Anker 1997, pp. 265–267.
- 175 Wilson 1995, pp. 190–191, 193; Pedersen 1997, pp. 5–6 with references; most recently Fuglesang 2004, p. 231 f., Hauglid 1969 and 1976 is a lone dissenting voice.
- 176 The discussion is wide-ranging see Hohler 1995, 1999 II, pp. 22–24; Pedersen 1997 and Fuglesang 2004 with references.
- 177 Bugge 1953, pp. 36–38; Anker 1970, p. 416. For the discussion of Urnes, see above.
- 178 Hohler 1999 II, p. 57 etc. with reference to Düwel 1986.

- 179 Hohler 1995, 1999 II, pp. 22–25, 55–58.
- 180 Pedersen 1997, p. 112; cf. also Fuglesang 2004, pp. 231–232.
- 181 Anker 1997, p. 267 also points out that the original use of symbols may have been exhausted and there was a move to a purely secular tradition
- 182 This material has been commented on by Hohler with references to Magerøy (1967) for Icelandic dressed timber. Swedish dressed timber is covered in a number of contexts, incl. Karlsson, “Romansk träornamentik i Sverige” (“Romanesque woodcarving in Sweden”) in *Acta Universitatis Stockholmiensis* 27, 1976. Portal fragments from Blomskog in Värmland have similar motifs and composition as the Sogn-Valdres portals (see Hohler 1999 II, p. 91). Lagerlöf 1985, p. 240 sees this as reflecting the proximity with Norway. The chance of this equally being a parallel phenomenon, going back to a common source, is not discussed in the research but should be of interest.
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- 185 Hohler 1999 I, chap. 4; Hohler 1999 II, chap. 5.
- 186 Lagerlöf: *Garde kyrka*, Sveriges Kyrkor p. 145, (Garde church. Sweden’s Churches) Stockholm 1972, d.s. “Medeltida träkyrkor i Sverige. En översikt” (“Medieval wooden churches in Sweden. An overview”) *Hikuin* 9, Højbjerg 1983, pp. 125–142; Lagerlöf, and Stolt: *Hemse kyrkor*. Sveriges kyrkor (Hemse church. Sweden’s Churches), p. 131, Stockholm 1969; d.s.: *Eke kyrka*. Sveriges kyrkor (Eke church. Sweden’s Churches) p. 156, Stockholm 1974; Mårtensson 1983, pp. 143–162; Trotzig: “En arkeologisk undersökning i Garde kyrka på Gotland” (“An archaeological investigation of Garda church on Gotland”) in *Fornvännen* 65, 1970; d.s.: “En stavkyrka i Silte” (“A stave church in Silte”) in *Gotländsk Arkiv*, Visby 1972; d.s.: “Holzkirchen archäologie auf Gotland und der Sonderfall von Silte” i Ahrens (Ed.): *Frühe Holzkirchen im nördlichen Europa.*, Hamburg 1981, pp. 227–293.
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Abbreviations

- AA, Ra Antikvarisk Arkiv (Historical Archives), Riksantikvaren (The Directorate for Cultural Heritage).
- FMFÅB Foreningen til norske fortidsminnesmerkers bevaring (Fortidsminneforeningen) (Society for the Preservation of Ancient Norwegian Monuments) Yearbook 1845–.
- KLNM Kulturhistorisk Leksikon for Nordisk Middelalder (Encyclopedia for Nordic Medieval cultural heritage), bd. 1–22, 2. ed. Cph. 1982.
- NIKU Norsk institutt for kulturminneforskning (Norwegian Institute for Cultural Heritage Research.)
- UiO University of Oslo

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INDEX

A

Adam av Bremen 147
Ahrens, Claus 163
Akershus Castle 84, 85
Almevik, Gunnar 123
Andersen, Aksel 30
Andersen, Elisabeth 61,62, 63
Anker, Leif 97, 168, 172, 175, 187, 189
Anker, Peter 97, 153, 178, 179
Aubert, Andreas 71, 72, 73, 90

B

Bartholin, Thomas Seip 95, 105, 106
Berg, Arne 93, 111, 112
Binding, Günther 154
Bjerknes, Kristian 27, 150, 151, 152, 155, 156, 159,
165, 180
Blindheim, Martin 150, 153, 160
Blix, Peter Andreas 30, 32, 71, 76, 146, 197
Boëthius, Gerda 149, 150, 160, 165
Bogarth, Seth 85
Bolstad Farm 79
Bonde, Niels 102
Borgestuen in Gjerpen 72
Borgund Stave Church 21, 23, 24, 27, 28, 29, 30, 31, 32,
44, 67, 69, 71, 97, 98, 109, 116, 118, 145, 149, 150,
158, 161, 168, 169, 170, 189, 192, 192
Borgund bell tower 41, 42, 44, 45,
Brandt, Nils 103, 104, 105, 111,
Breen, Adam van 85
Bugge, Anders 77, 97, 149, 150, 151, 153, 162, 170
Bull, Georg Andreas 139, 144

C

Christie, Christian B. 139
Christie, Håkon 19, 20, 21, 81, 88, 89, 105, 113, 113, 126,
127, 136, 150, 151, 152, 155, 155, 156, 157, 159, 160,
165, 177, 180, 181, 182, 183, 186, 188
Christie, Sigrid Marie 56, 67, 73, 77, 81, 84, 85, 155

D

Dahl, Johan Christian Clausen 14, 137, 138, 139, 140,
141, 142, 146, 164, 168, 169
Dale Church 72
Dietrichson, Lorentz 97, 125, 135, 136, 137, 139, 141,
142, 143, 144, 145, 146, 146, 147, 148, 149, 150, 154,
155, 156, 160, 164, 165, 170, 174, 176,
Douglass, Andrew Elicott 91

E

Eidem, Per 92
Eidsborg Stave Church 18, 24, 72, 75, 77, 78, 105, 118,
192, 192
Ekhoff, Emil 147, 148, 149
Ely Cathedral in England 160
Erdmann, Domenico 72, 73, 83, 84, 85

F

Fearnley, Thomas 143
Fett, Harry 71, 72, 75
Finnesloftet 116
Flesberg Stave Church 19, 45, 51, 53, 55, 56, 56, 77, 82,
100, 193, 193
Flintoe, Johan 137, 139
Flåm Church 71, 84
Frøstrup, Anders 123

- Frøysaker, Tine 99
 Fuglesang, Signe 162, 165
 Fåvang Church 86
- G
- Gadamer, Hans-Georg 130, 131
 Garmo Stave Church 18, 125, 193, 193
 Gaupne Church 86
 Gertner, Johan Vilhelm 137
 Gjelsvik, Erlend 42
 Gjerdrum, Peder 95
 Godal, Jon Bojer 123, 158
 Gol Stave Church 19, 23, 29, 30, 45, 77, 82, 84, 86, 97,
 98, 98, 116, 125, 189, 194, 194
 Grevenor, Henrik 72, 83, 84
 Grinaker Stave Church (demolished) 97
 Grip Stave Church 18, 20, 77, 78, 79, 80, 86, 87, 194,
 194
 Guldrupe in Sweden (portal from lost stave church) 147
- H
- Hadrian's temple in Ephesus, Turkey 81, 83
 Haltdalen Stave Church 18, 19, 24, 111, 112, 118, 124,
 125, 132, 133, 195, 195
 Hauglid, Roar 75, 76, 97, 136, 150, 153, 154, 155, 156,
 174, 175, 177, 178, 179, 180, 185
 Haven, Salomon von 85
 Hedalen Stave Church 18, 23, 58, 59, 59, 60, 60, 61, 61,
 62, 67, 75, 76, 89, 104, 118, 188, 195, 195
 Hedared Stave Church in Västergötland, Sweden 17, 147
 Heddal Stave Church 19, 22, 60, 67, 75, 77, 105, 135,
 137, 140, 141, 142, 143, 151, 196, 196, 205
 Hegge Stave Church 19, 104, 196, 196
 Hemse Stave Church on Gotland, Sweden (demolished)
 146, 147, 148
 Hendtzel, Gottfried 84
 Himmler, Heinrich 150
 Hoff, Anne Marta 73
 Hohler, Erla Bergendahl 55, 97, 135, 136, 149, 160, 161,
 161, 162, 163, 171
 Holdhus Church 84
 Hopperstad Stave Church 19, 23, 29, 30, 31, 31, 32, 45,
 67, 71, 71, 72, 75, 76, 76, 77, 78, 79, 86, 96, 97, 98,
 110, 111, 111, 114, 114, 116, 145, 150, 153, 158, 160,
 162, 164, 197, 197
 Huseby, Stange 72
 Husterknupp house in Ertal, Germany 152, 154, 166, 179
 Hylestad, portal from lost stave church 171
 Høgseth, Harald Bentz 121
- Høre Stave Church 19, 23, 104, 105, 145, 149, 198, 198
 Høyjord Stave Church 18, 45, 75, 76, 77, 97, 102, 103,
 151, 175, 176, 197, 197
- J
- Jelling Church and runic stone in Denmark 150, 156, 166
 Jensenius, Jørgen H. 136, 144, 157, 189
 Jostedal Church 84, 85, 86
- K
- Kaland, Bjørn 81
 Kaupanger Stave Church 19, 22, 23, 45, 77, 80, 87, 88,
 96, 97, 98, 109, 110, 110, 115, 115, 116, 136, 152,
 187, 198, 198
 Kielland, Jens Z.M. 145, 149, 150, 164
 Kinsarvik altar frontal 64
 Kloster, Robert 76
 Krafft, Finn 77
 Krogh, Knud J. 105, 107, 108, 113, 113, 126, 136, 152,
 156, 159, 160, 161, 162, 163, 168, 180, 183, 184, 184,
 185, 185, 186, 186, 187, 188
 Kvernes Stave Church 18, 70, 77, 78, 78, 79, 85, 86, 88,
 199, 199
- L
- Langberg, Harald 155, 157, 166
 Lexow, Einar 72, 83
 Lidén, Hans-Emil 137, 139, 152, 165
 Lindqvist, Sune 147, 148, 149, 152
 Lom Stave Church 19, 25, 77, 78, 94, 103, 118, 122,
 152, 156, 193, 199, 199
 Lomen Stave Church 19, 23, 45, 104, 136, 145, 149,
 157, 200, 200
 Lårdal Stave Church (lost) 64, 67, 75, 77
- M
- Marumrud, Hans 30, 40, 120, 122, 124
 McNicol, John 137, 144
 Mehlum, Sjur 158, 163, 187
 Mejborg, Reinhold 78
 Meyer, Johan 138, 148, 149, 150, 165
 Mohn, Agnete 72, 79, 81, 83, 84
 Moses maler 84
 Mowinckel, Rolf 149, 170
 Munkeliv, ruin of monastery church in Bergen 160
 Munthe, Gerhard 72
 Myhre Øystein 124
 Myhre, Bjørn 156, 166
 Mære Church 152, 177

Møðruvellir altar frontal, Iceland 64
Mårtensson, Anders W. 156

N

Nes Stave Church (demolished) 22, 97, 136
Nicolaysen, Nicolay 72, 137, 139, 140, 141, 142, 143,
144, 145, 145, 146, 147, 155, 164
Nidaros Cathedral 162
Nordrumshaugen, Stig Andreas 42, 122
Nore Stave Church 18, 23, 24, 27, 37, 37, 38, 39, 39, 41,
55, 72, 74, 75, 77, 78, 79, 81, 83, 83, 84, 84, 86, 88,
89, 101, 101, 119, 120, 131, 159, 200, 200
Nore Vicarage 121

O

Olsen, Olaf 152, 177
Oppdal Church 78, 78
Ording, Asbjørn 92

P

Pedersen, Elin L. 162
Pedersen, Ragnar 159
Phleps, Hermann 150, 165
Planke, Terje 158, 163, 173, 175, 188, 189
Polanyi, Michael 129, 131

Q

Qvale, Wenche 136, 137

R

Raulåna, Oppdal 85
Ree, Birger 148
Reimers, Egill 99
Reinli Stave Church 20, 23, 60, 61, 62, 62, 63, 67, 94,
104, 115, 116, 118, 119, 201, 201
Renmælmo, Roald 124
Rennebu, portal from demolished stave church 161
Ringebu Stave Church 19, 25, 51, 52, 53, 53, 54, 55,
56, 59, 61, 63, 64, 67, 77, 78, 86, 103, 180, 201, 201
Rolf, Bertil 129
Rollag Stave Church 18, 55, 56, 57, 63, 64, 64, 65, 65,
66, 66, 67, 67, 75, 77, 83, 84, 97, 100, 100, 116, 148,
202, 202
Rollag Vicarage 83, 85
Rolstadloftet 189
Rusach, Valentinum Bolten aff 79
Rødven Stave Church 18, 23, 77, 85, 88, 88, 202, 202
Røldal Stave Church 20, 75, 77, 79, 84, 97, 157, 203, 203

S

Schiertz, Franz Wilhelm 138, 139, 140, 142, 168, 169
Schirmer, Herman Major 135, 145, 146, 148, 148, 149,
164, 165
Schnitler, Carl Wille 72, 83, 84, 85
Seip, Jens Arup 164
Slidredomen – Vestre Slidre Church 75
St. Andrews Church in Greensted, England 17, 139, 147,
164
St. Clemens Church in Lund, Sweden 150
St. Mary church ruins, Oslo 152
Sancta Maria Minor in Lund, Sweden 146, 147, 148, 149
Stellerburg house in Ditmarsken, Germany 152
Stenvold, Konrad 124
Stornes, Jan Michael 105
Storsletten, Ola 99, 100, 104, 157, 175, 189
Stylegar, Frans-Arne 189
Svarva, Helene Løvstrand 105
Södra Råda Old Church in Sweden 74, 81
Sørumsgård, Sverre 123

T

Thun, Terje 99, 105, 106, 159
Tollbodgaten 14, Drammen 85
Tordsen, Willem 85
Torpo Stave Church 19, 64, 67, 73, 74, 75, 76, 77, 81,
85, 87, 88, 98, 116, 157, 203, 203
Tschudi-Madsen, Stephan 56

U

Ullén, Mariann 163
Undredal Stave Church 18, 23, 77, 78, 79, 84, 141, 204,
204
Uppåkra archaeological site in Sweden 152, 153
Urnes Stave Church 19, 22, 23, 24, 31, 33, 33, 34, 35,
35, 36, 36, 37, 45, 51, 52, 56, 57, 58, 58, 66, 67, 74,
77, 78, 79, 80, 81, 81, 83, 85, 87, 88, 89, 91, 96, 97,
98, 105, 106, 107, 107, 108, 109, 110, 111, 113, 113,
114, 114, 115, 116, 118, 136, 141, 142, 145, 149, 150,
151, 151, 152, 153, 155, 156, 157, 159, 159, 160, 161,
162, 163, 166, 168, 177, 178, 179, 180, 181, 182, 183,
184, 184, 185, 185, 186, 186, 187, 204, 204
Uvdal Stave Church 18, 20, 45, 66, 72, 77, 78, 82, 83, 84,
84, 88, 89, 102, 102, 119, 158, 205, 205

V

Vang Stave Church 17, 20, 138
Vøyen farm house 79
Vågä, portals from lost stave church 161

INDEX

W

Weisser-Svendsen, Eva 77

Wickstrøm, Anne 75, 77

Winther, Knud 86

Z

Zarnecki, George 160

Ø

Østre Vikersund, farm house 85

Øye Stave Church 20, 205, 205

Å

Ål Stave Church (demolished) 67, 73, 74, 75, 77, 85,
99, 99, 164

Åmodt, Kristen 120, 123

Årdal Church in Ryfylke 71, 86

