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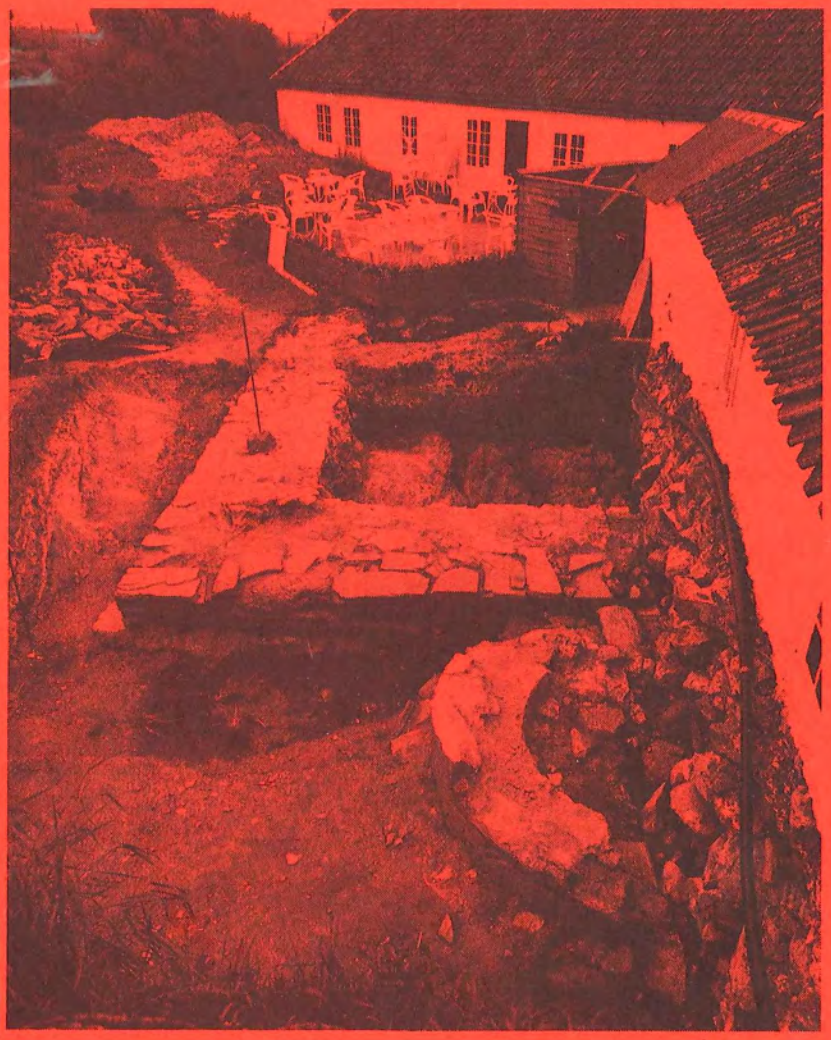

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THE CHURCH OF THE BENEDICTINE ABBEY OF NIDARHOLM.

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THE RUIN SPEAKS .....

The Church of the Benedictine Abbey of Nidarholm.
Report from excavations on the island of Munkholmen, Trondheim 1988-1989.

by

Christopher McLees

Riksantikvaren, Utgravningskontoret for Trondheim

Trondheim, 1992

PREFACE

Recent excavations conducted on the site of the medieval monastery of Nidarholm have at last brought to light part of the long-vanished ruin of the abbey church, as well as a good deal of evidence associated with more recent activity in and around the ruin. The following report embodies a detailed account and interpretation of all the archaeological remains recorded on the site. Interpretation is based upon stratigraphical and other means of analysis. This is often complex, and in order to portray the material as thoroughly and as lucidly as possible, the report is divided up in the following manner:

Chapter 1 outlines the background to the excavation, and presents the administrative and procedural details pertaining to it, as well as a brief introductory account of the island's history and topography, paying particular regard to the building-historical aspects, all of which have had some direct or indirect impact on the site. In **Chapter 2** and **Chapter 3** attention is focused on the evaluation and interpretation of the raw archaeological data: Firstly, a reconstruction of the constructional and depositional events represented by the sequence of layers and structural remains is presented in **Chapter 2**. This is an attempt to formulate a sequence of distinct phases of occupation and related activity, and, by means of associated datable artefacts, to place these phases within a chronological framework. **Chapter 3** is designed to cater to those whose main interest lies in the particular character of the remains of the medieval stone buildings rather than the details of their stratigraphical context, and it is here that the stone structures are described and discussed in specific detail. **Chapter 4** attempts a synthesis of all the available information - archaeological, architectural, historical - in order to view all the excavated features in the light of this small island's complex history of occupation. The main conclusions are summarized in the final chapter.

Trondheim, February 1992

Erik Jondell

"Arkeologiske undersøkelser i Trondheim" ("Archaeological Excavations in Trondheim") is a series of reports from medieval archaeological excavations in Trondheim after 1970. Reports from both large and small excavations will be published. The main aim of the series is to create a tool for further work with the Trondheim material in the form of a databank. The reports are therefore duplicated in restricted numbers and in basic form.

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Munkholmen from the air. Site arrowed. Looking W.

ACKNOWLEDGEMENTS

As all who have spent some time there will know, Munkholmen is a rather special place. For me personally, my time there in May 1989 is associated with two momentous events: the simultaneous arrival into the light of day of my daughter Sunniva and the long-vanished ruin of the abbey church.

Anna Petersén and Alf Tore Hommedal are owed many thanks for their contributions to the excavations, as professional colleagues and friends. The daily trips to and from the island were always pleasurable, and I would like to thank Herman Valsø for providing this service.

Alf Tore Hommedal contributed much of his expertise, both during the excavations and in his comments on this report. I would also like to thank Øivind Lunde for his criticism and suggestions.

Last, but far from least, Marit Longva deserves much gratitude for her patient and skilled editing and laying-out of the manuscript.

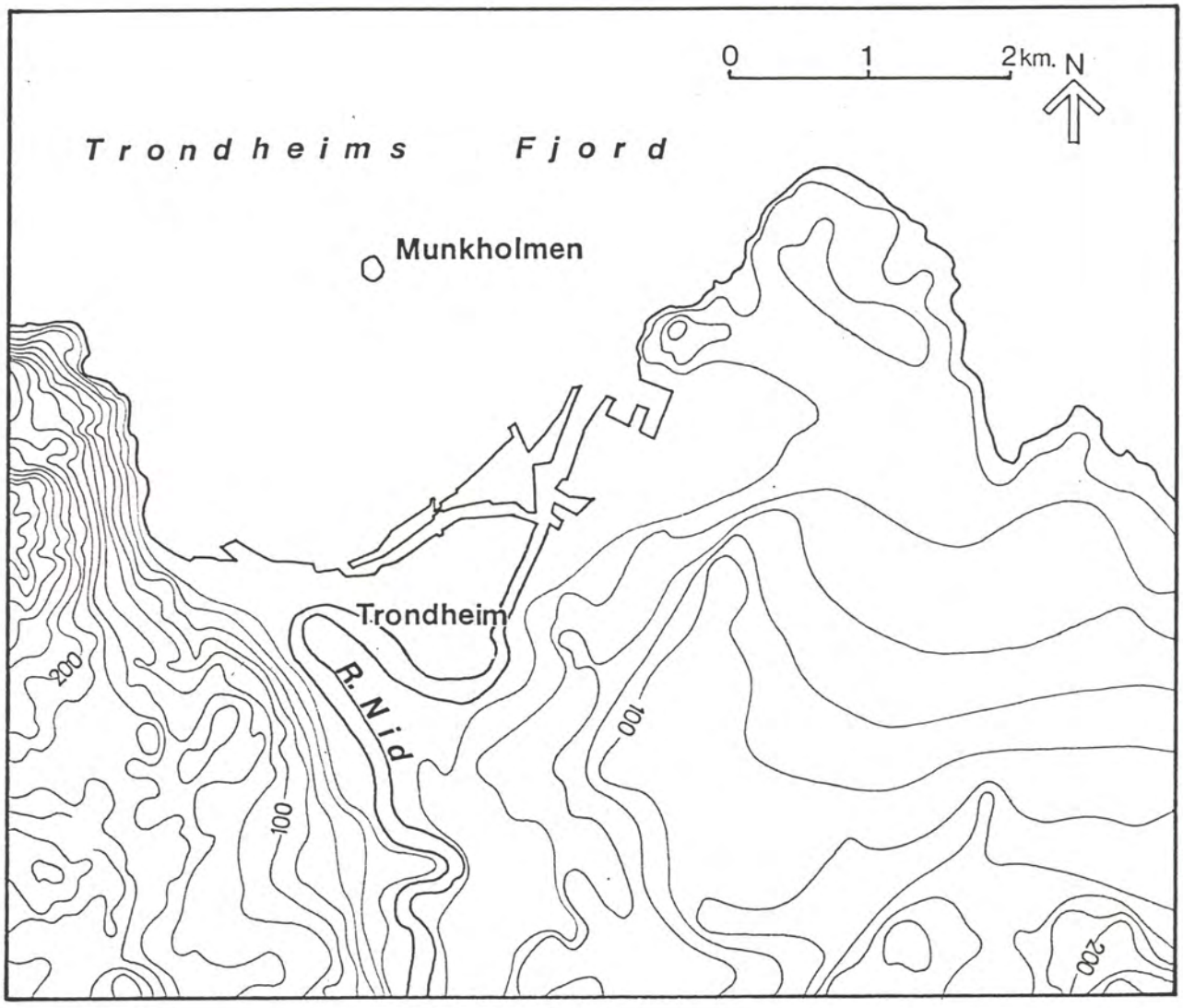

Fig. 1 *The Island of Munkholmen: Location.*

"The ruin speaks that sometime
It was a worthy building"

William Shakespeare
Cymbeline Act IV, Scene II

1. INTRODUCTION

1.1 The Island of Munkholmen: Location and Topography.

Munkholmen is a small island of approximately 1.75 ha (c.4.3 acres) situated in the Trondheim Fjord some 2km north of the alluvial peninsula on which stands the oldest part of the city of Trondheim (also known formerly as Nidaros) (Fig. 1).

The island's shore rises steeply from sea-level to c. 5m.a.s.l at the base of the present perimeter wall whose broad earthen ramparts conceal much of the island's peripheral topography (Frontispiece and Fig. 2).

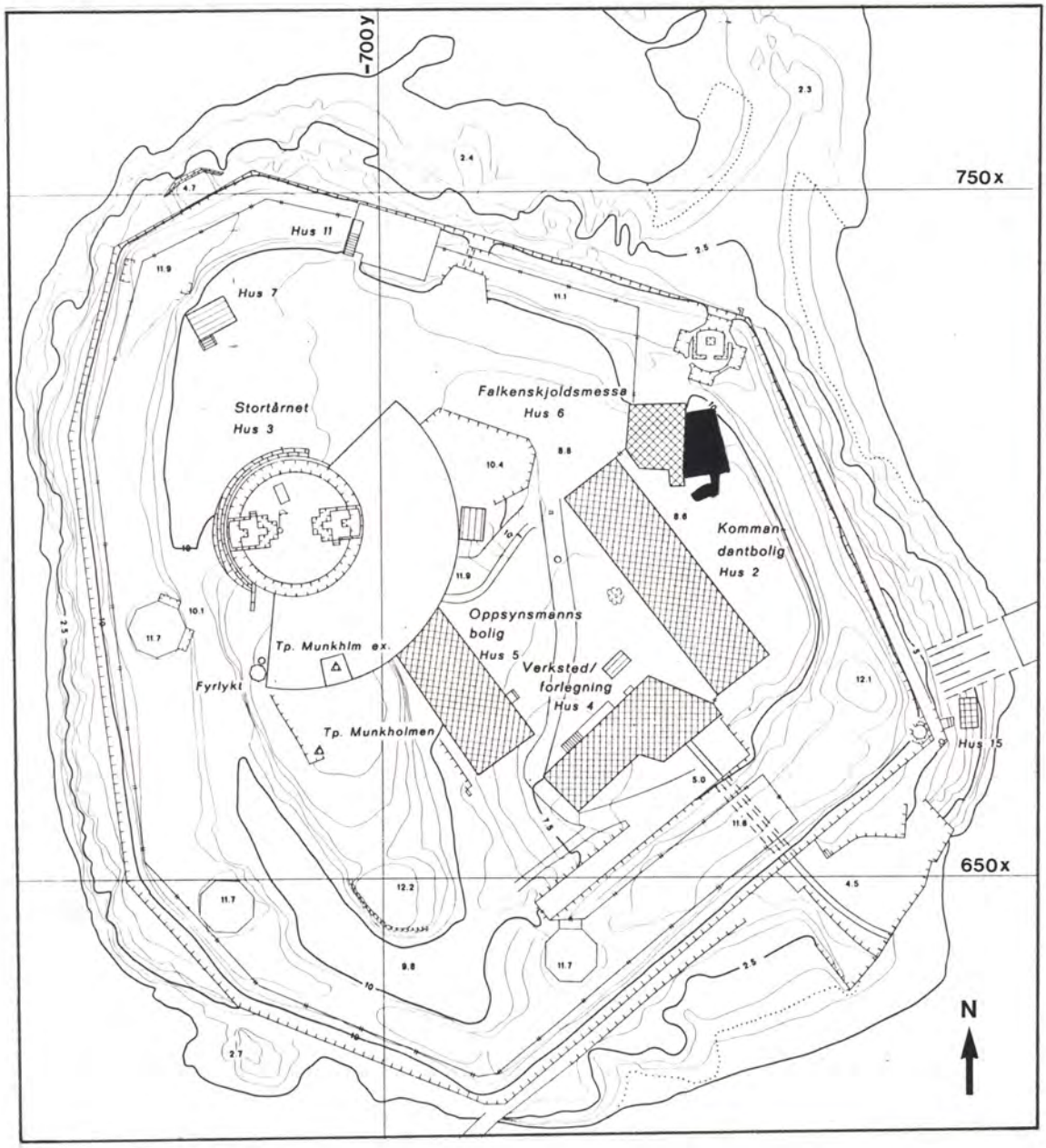

Fig. 2. Munkholmen: Topography and excavated area 1988-89 (dark). 1:1000.

The W. half of the island consists of a 12m-high rocky knoll, the northern flank of which is occupied by a large round stone tower. The ground falls steeply to the north and east of the outcrop, and it is on the flatter terrain in its lee to the east that most of the present buildings stand.

All above-ground structures date from 1671 to the present day, the island's interior being the scene of a great deal of post-medieval building work in connection with the island's more recent role as a coastal fortress and State Prison. Associated building work took place around the perimeter, the present polygonal ramparts concealing within them two previous phases of perimeter walls (Figs. 3, 10 and 12).

The island's history is much older, however, and for most of the medieval period it was the site of the Benedictine Abbey of Nidarholm (or Holm), as the island was known in contemporary records. The actual location and character of the monastic complex has only been established through recent archaeological excavations in the eastern half of the island's interior. Dr. Øivind Lunde conducted excavations here from 1967 to 1970, and his discoveries and those made during the most recent excavations conducted by the present author have revealed fragmentary portions of the principal structures forming the monastic complex (Figs. 3 and 8).

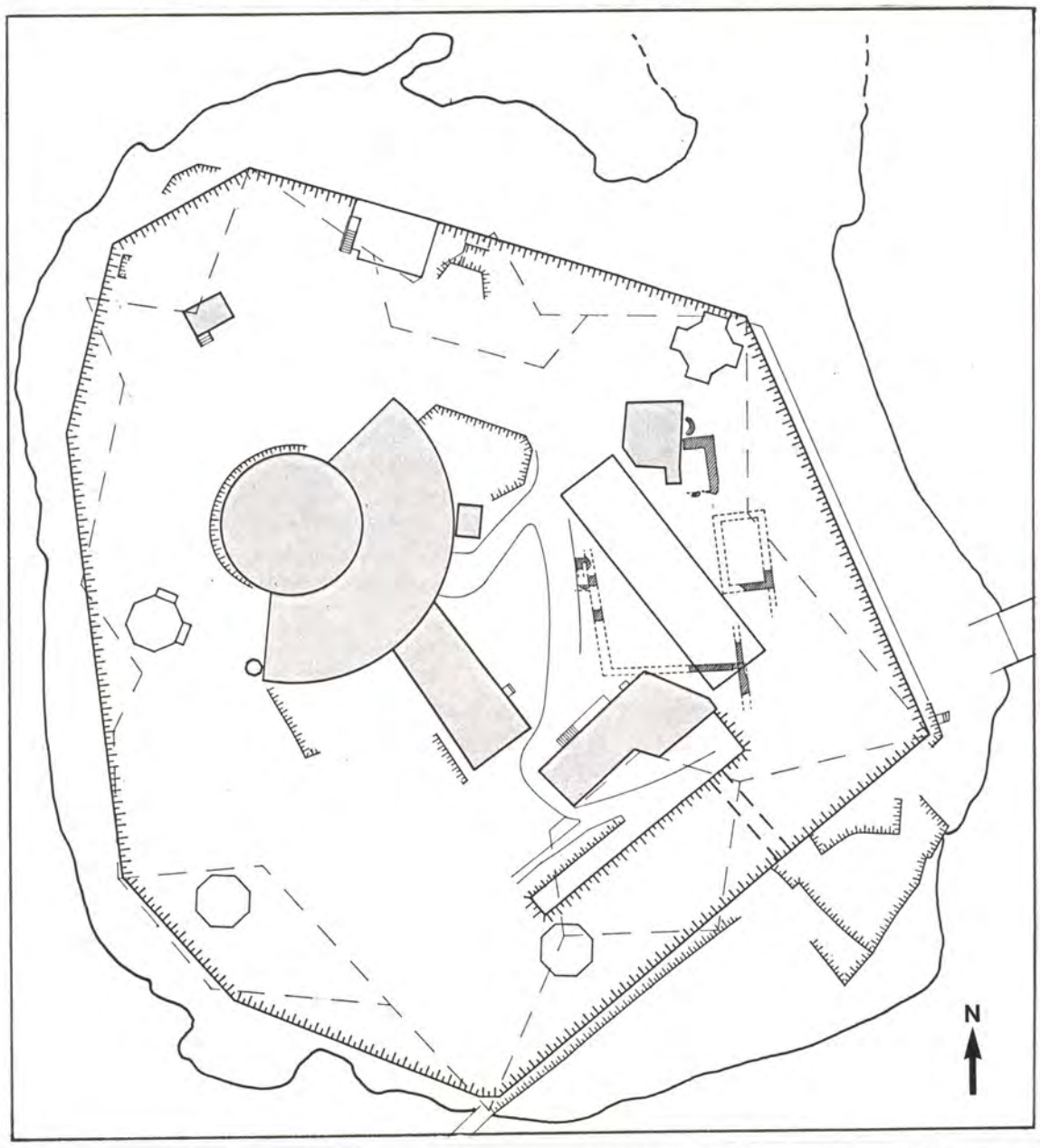

Fig. 3. *Munkholmen: The location and remains of the medieval monastic complex (hatched and dotted), and the post-medieval buildings (including the projected line of the 1689-90 star-shaped bastion perimeter walls). 1:1000. Drawn by J.Kregnes.*

1.2 The 1988 and 1989 Excavations: Location and Administrative Background.

In 1988, **Riksantikvaren** was advised by **Statens Bygge- og Eiendomsdirektorat** that, due to the effect of damp on the floor of Falkenskjoldsmessen (FM) (Fig. 2), it was necessary to undertake external drainage work along the building's eastern wall, which stands partly under ground level. Since the island's significant archaeological potential is protected under the **Cultural Heritage Act of 1978,** any work of such a manner required archaeological supervision. This resulted in a 2-week archaeological excavation of a c. 10m long by 1m wide trench along the exterior of FM's eastern wall (**TA1988/12**; Trench A), the line of the projected drainage system.

The results gained from this investigative trench were of such importance as to justify the immediate suspension of further maintenance work in the locality. The line of a substantial east-west orientated mortared stone wall, with facing stones preserved on its N. side, and evidently preserved to a significant height and width, was located in the middle of the trench (Fig. 4). This wall's medieval origin was undoubted, and its position and state of preservation clearly suggested that the area immmediately to the east of FM was of outstanding archaeological potential. That this portion of walling in all likelihood belonged to the medieval monastery of Nidarholm, and indeed, probably constituted the clearest remains yet encountered of the monastery's church building only served to increase expectations. Given this degree of potential, and the difficulty in assessing how one might institute the necessary drainage work, **Riksantikvaren** proposed that more extensive archaeological excavations here were justifiable, and a short excavation season was planned for the early summer of 1989.

The excavation of a c. 50m^2 area to the east of FM (Fig. 2) was originally estimated to take 5 weeks, beginning 2.5.89 and ending 2.6.89. The original cost was calculated at kr.124,815, of which **Statens Bygge- og Eiendomsdirektoratet** paid most, namely kr.90,000, **Riksantikvaren** contributing kr.19,815, and **Fortidsminnesmerkeforeningen** kr.15,000. However, an extension of 3 weeks (to 28.6.89) was necessary to finish the excavation satisfactorily, and an extra kr.58,000 was required, of which **SBE** paid kr.30,000, **RA** paid kr.25,000, and **FF** kr.3,000. The total cost of the excavation therefore came to **kr.182,815**.

A small team of 3 archaeologists was engaged to carry out the excavation. This consisted of the present author, supervisor, Anna Petersén, site assistant, and Alf Tore Hommedal, site assistant. It was occasionally necessary to supplement this team during bouts of heavy work, and others who took part were Per Borup, Kenan Fulks, Ole Bjørn Pedersen, and Ian Reed, with added help from two workmen based on the island.

1.3 Excavation Procedure: Excavated Areas, Co-ordinate System, Methods of Excavation, Site Documentation, Finds.

Prior to excavation, the area to the east of Falkenskjoldsmessen (FM) consisted of a trapezoidal terrace of soil, dropping down sharply to the south and bounded to the east by the rising bank of the rampart (Figs. 2 and 5). To the north it was bounded by a massive concrete platform for a German gun emplacement. The area's flat surface lay approximately at the same level as the intersection of FM's rubble foundation and walling proper (although it should be remembered that 1988's partially excavated Trench A removed a 10m long x 1m wide strip along the wall here - see archive report **TA1988/12** - which was duly incorporated into the 1989 area). This flat terrace to the east of FM formed a naturally delimited zone in which to concentrate the excavation (Fig. 6), and this comprised the main investigated area, known as **AREA A**. This

Fig. 4. *Munkholmen excavations 1988. A portion of the N. wall of Nidarholm Abbey's chancel found in the first trial trench along the E. wall of Falkenskjoldsmessen (left): looking N.*

Fig. 5. *Plate showing Excavation Area A, 1989. Looking N. Falkenskjoldsmessen to the left, German WWII gun emplacement in the background, the earthen rampart behind the perimeter walls to the right.*

initially comprised an area of approximately 65m^2, although shortly into the excavation period this was slightly reduced (by bringing in the east edge) to some 55m^2. The excavation encroached slightly into an area investigated by Lunde in 1970 (Fig. 8), and the southernmost stretch of walling uncovered here corresponds to a portion of walling revealed at that time. The projecting area to the south, **AREA B**, (Fig. 6) was opened up towards the end of the excavation period.

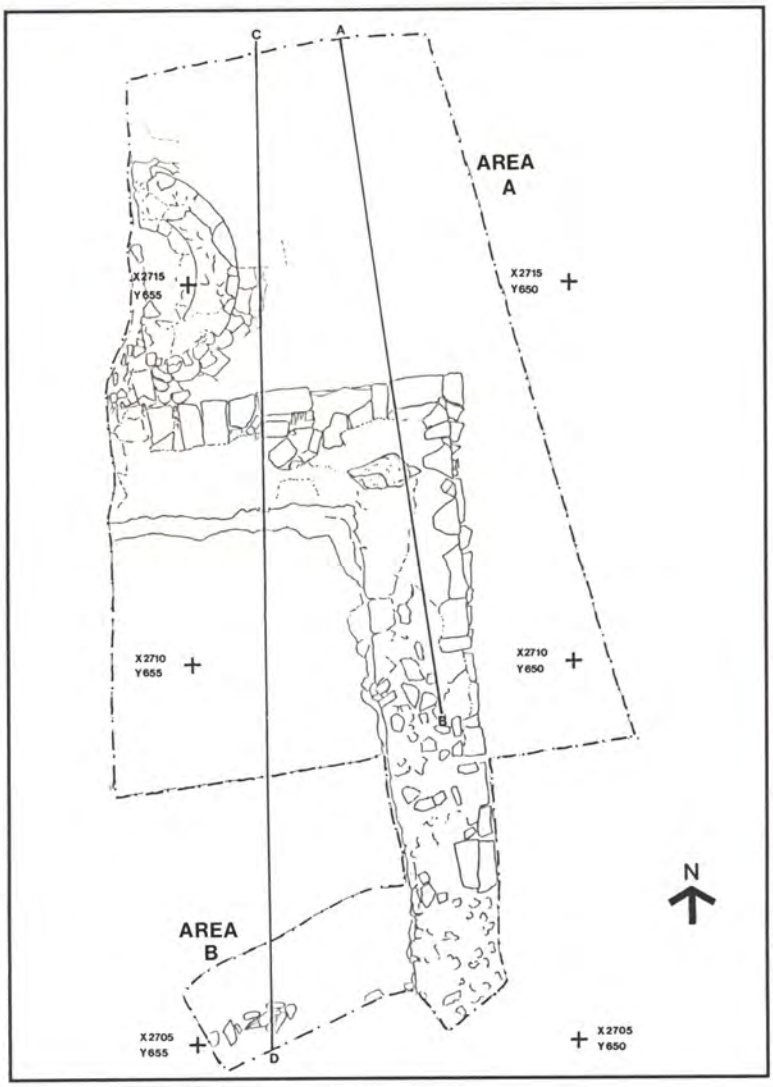

Fig. 6. *The Excavation Site 1989. Individual areas, co-ordinates, and the positions of the two main section profiles (Profiles 1 and 2: Fig. 15a and b). 1:100.*

The **co-ordinate system** was set up by Trondheim's **Oppmålingsvesenet**, and tied into the town grid. The temporary datum from last year was re-used in 1989, and was fixed to a height of **8.68** m.a.s.l.

The site was excavated according to normal stratigraphic procedure. It was hand-dug, using spades, "krafser", and trowels, there being no possibility for machine removal of overburden. Consequently, there was much heavy work, entailing the removal of large quantities of soil and loose stones. At a rough estimate, some 60m^3 were removed (averaging c. 3m^3 a day), mostly in the initial 4 weeks of excavation.

Site documentation entailed the use of a running sequence of context numbers, with each context being described in detail on a context card, and its relevant stratigraphic relationships

recorded. Details and interpretative discussion were included in the site daybook. A series of plans drawn at 1:20 were compiled, showing layers and features at appropriate planning levels. The relatively uninformative perimeter profiles were not drawn; instead a N-S profile cutting through the middle of the site was reconstructed using a series of heights which were recorded systematically along a mid-site line (Profile 1: A-B, Figs. 6 and 15a). Heights at planning levels were also recorded on all other parts of the site. Occasional sketch profiles at important places within the site were drawn to assist interpretation. A number of stone walls were found and these were also drawn in elevation, either at 1:10 or 1:20. A large number of colour slides and black-and-white photographs were taken of the site at all stages of excavation.

All documentation material relating to this and to previous excavations, including those conducted in 1968-1970, is stored in the archive of **Riksantikvarens Utgravningskontor, Trondheim.**

The finds material deriving from this excavation, **TA1989/5**, was processed and registered by the Finds Office and was subsequently delivered to **DKNVS museum** in Trondheim for conservation and storage. For a classified survey of the finds material, see Appendix I.

1.4 From Nidarholm to Munkholmen: Historical and Archaeological Background.

Despite its small size, the island has played a significant role in the history of the region, its location offering a focal point at once both close to and separate from the mainland and the town to the south, an intimate yet distanced relationship appreciated from earliest recorded times. In the late 10th century and the days of the Lade Earls and King Olav Tryggvason, the island seems to have been used as a place of execution. With the coming of the monastery the gallows were moved the short distance south to the peninsula on which the early town of Nidaros was flourishing. However, the exact date at which the first monastic foundation was established on the island, known as "Holm" or "Nidarholm" during the medieval period, has been open to some debate due to some disagreement between the historical sources (see Lange, 1856, 199-214).

According to a 13th-century document written by the English monk Matthew Paris, King Knut the Great allegedly founded a Benedictine abbey "on Holm by Nidaros" in 1028. Another English author, John Bromton, repeats this, noting that, following his return from Rome Knut established two monasteries, one in Norfolk in England (known as "Holm") and one in Norway. Knut is indeed recorded as having visited the early settlement of Nidaros in 1028 following his return from pilgrimage. Matthew Paris visited the monastery of Nidarholm, as it was known, in 1248, and it is Lange's opinion that there is no reason to doubt that he conveyed the foundation's history as it was known to the 13th-century monks. However, 12th-century Norwegian-Icelandic sources provide what appear to be a contradictory version, claiming that the first monastery to be established on the island was the Benedictine abbey founded at the beginning of the 12th century by a local noble, Sigurd Ullstreng, a vassal of King Magnus Barelegs. According to one of these sources, the monk Theodericus, this reputedly occurred after King Magnus' final campaign in Ireland (1103), and Nidarholm monastery was therefore of about the same age as Munkeliv monastery in Bergen (c.1105-1110).

Lange suggests that what all these sources might reflect is that Sigurd Ullstreng in fact re-established the foundation, though not merely by adding to a pre-existing complex of buildings, but by erecting the first substantial structures on the island: "....it is possible that King Knut of Denmark did indeed found, or at least provide funds for and begin the construction of a monastery on Nidarholm, to which he brought Benedictine monks from England, but that the short and unpopular reign of Knut's regents in Norway, and the population's indifference towards

the completion of the project hindered the English monks' attempts to establish the foundation, the buildings of which were abandoned to decay following the death or flight of the first foreign occupants". Furthermore, since Theodericus was himself a monk at either Nidarholm or Elgeseter in Nidaros, and wrote his history sometime around 1180, it seems unlikely that, had Knut's monastery survived beyond 1035 as a substantial foundation in structural terms, Theodericus would have neglected to remark upon this (Lange, 1856, 200-201). Consequently, it may be possible that Sigurd actually established the first substantial (stone?) buildings on a site which did not bear any noteworthy surviving structures from the earlier foundation.

Modern scholars (Gunnes, 1987, 51, and Lunde 1987, 113) tend to lay greater emphasis on the testimony of the Norwegian-Icelandic sources, the monastery having in all likelihood been established by Sigurd Ullstreng of Viggja in the first decade of the 12th century.

If Knut did found a monastery here in 1028, then it was the first conventual foundation in Norway, and indeed, in Scandinavia. At the very least, if Sigurd Ullstreng was the original founder in the first decade of the 12th century, then with Selje and Munkeliv, Nidarholm comprises one of the first monasteries in the country. It was certainly one of the wealthiest, at least from the time of Sigurd's endowment onwards, with significant landed wealth in the region. An early royal benefactor, Magnus the Blind, was given sanctuary on the island in 1135. During the 13th and 14th centuries the monastery had its own ship engaged in trade with England, as well as its own mill near Nidaros.

The monastery is generally poorly represented in medieval sources, and is only sporadically mentioned after 1300. Although not verified, the monks may have possibly belonged to the reformed Cluniac Order of Benedictines, at least for a short period (although the monastery is not registered at Cluny the community might well have organized itself along Cluniac lines without actually being a formal member). The monastery church was dedicated both to St. Benedict and to St. Laurence; the latter name seems to have been used most frequently, according to Lange. The monastery's 13th-century seal (Fig. 7), has been the subject of much speculation. It is traditionally thought to depict a round church of Romanesque form, with four appended towers, and the 18th-century antiquarian Gerhard Schønning and others have suggested that such a church may lie incorporated within the fabric of the island's present round tower, built in the early 1670s. Among others, the military historian Widerberg (1936, 62-63) is sceptical, pointing out that there is absolutely no material evidence to contradict the likelihood that this tower was built from the ground up in the late 1600s, although there is no extant material evidence against such a theory either.

Fig. 7. Nidarholm Abbey's 13th-century seal.

The monastery still had a named abbot up to the mid 1530s, and it was formally dissolved as a consequence of the Reformation in 1537, when Norway's last Catholic archbishop, Olav Engelbrektsson, fled Trondheim and the Danish fleet which attacked the island defended by a garrison of the archbishop's men. It is possible that the monastery was abandoned some years previously following the town fire in 1531, though there is some doubt as to whether in fact the isolated monastery could really have suffered the same fate as the rest of the town during the extensive fire of that year, brought about by lightning hitting the cathedral (of course, lightning may also have hit the island independently). Certainly, however, the monastery does not appear to be mentioned in any official letters following 1531 (Lange, 1856, 213). Otherwise, the monastery was ravaged by fire on at least two previous occasions: in 1210 and 1317.

Prior to recent discoveries, the last recorded sighting of medieval structures on the island was occasioned by the visit of Bishop Neumann in 1827. Øivind Lunde (1977, 152) suggests that the bishop's description of structural remains uncovered at that time matches the character and dimensions of the chapter house, excavated in 1970 (Fig. 8). During the years 1968-1970 Lunde conducted a series of excavations on the island, the results of which allowed him to locate and reconstruct the probable extent and form of the medieval monastic enclosure (Fig. 8). The surviving evidence is suggestive of an arrangement common to such monastic enclosures, namely ranges of buildings set around a square, or sub-square cloister garth. The aforementioned chapter house was represented by a floor of closely-laid stone slabs, beneath which was found a grave (of a former abbot?). This was the most substantial structure found by Lunde, and it is possible that this building and the recently discovered church comprised the only stone buildings in the enclosure, the rest probably being built of wood on stone foundations within a perimeter stone wall. Fragments of stone walling associated with the western, southern and eastern wings were uncovered by Lunde, heavily disturbed by post-medieval building work, though until 1988 nothing which could at the time be confidently related to the north wing was found. None the less, enough indications existed to allow Lunde to suggest that the northern wing, situated immediately south of the graveyard (as indicated by the location of a number of articulated skeletons), formerly contained the church, and that it was likely to comprise a building more in keeping with the sub-square layout of the enclosure, rather than a round building as conjectured from the seal (Lunde 1987, 113).

The structural remains so-far discovered are fragmentary. The monastic buildings have been almost completely demolished, and what stonework remains above bedrock has disappeared under later buildings and redeposited soil. This process of destruction presumably followed upon the abandonment of the monastery in either 1531 or 1537. How long this process of destruction took, and whether it took place in any particular connection during the period following the dissolution of the monastery is not recorded, though it is possible to speculate with Widerberg (1936, 63) that right from the time of its abandonment in the 1530s the ruin was plundered as a source of building stone, a fate suffered by many of Trondheim's churches: for example, another local monastery, Elgeseter, to the south of the town, is known to have been systematically robbed of stone after 1606 (Lunde, 1987, 114). However, all that we actually know about the island in the early post-Reformation period is that it was allocated to the Town Magistrate ("Byfogden") for private use as meadowland. If the map (Fig. 9) of the town and environs drawn in 1658 by the Swedish mining engineer-cum-cartographer Naucler is taken at face value, then by this time the island bore no standing structures whatsoever. There is no recorded occupation here until the arrival of the Swedish army in 1658, although from that date onwards increasingly comprehensive building activity took place within the restricted confines of the island which from this time on was known as Munkholmen ("Monk Island").

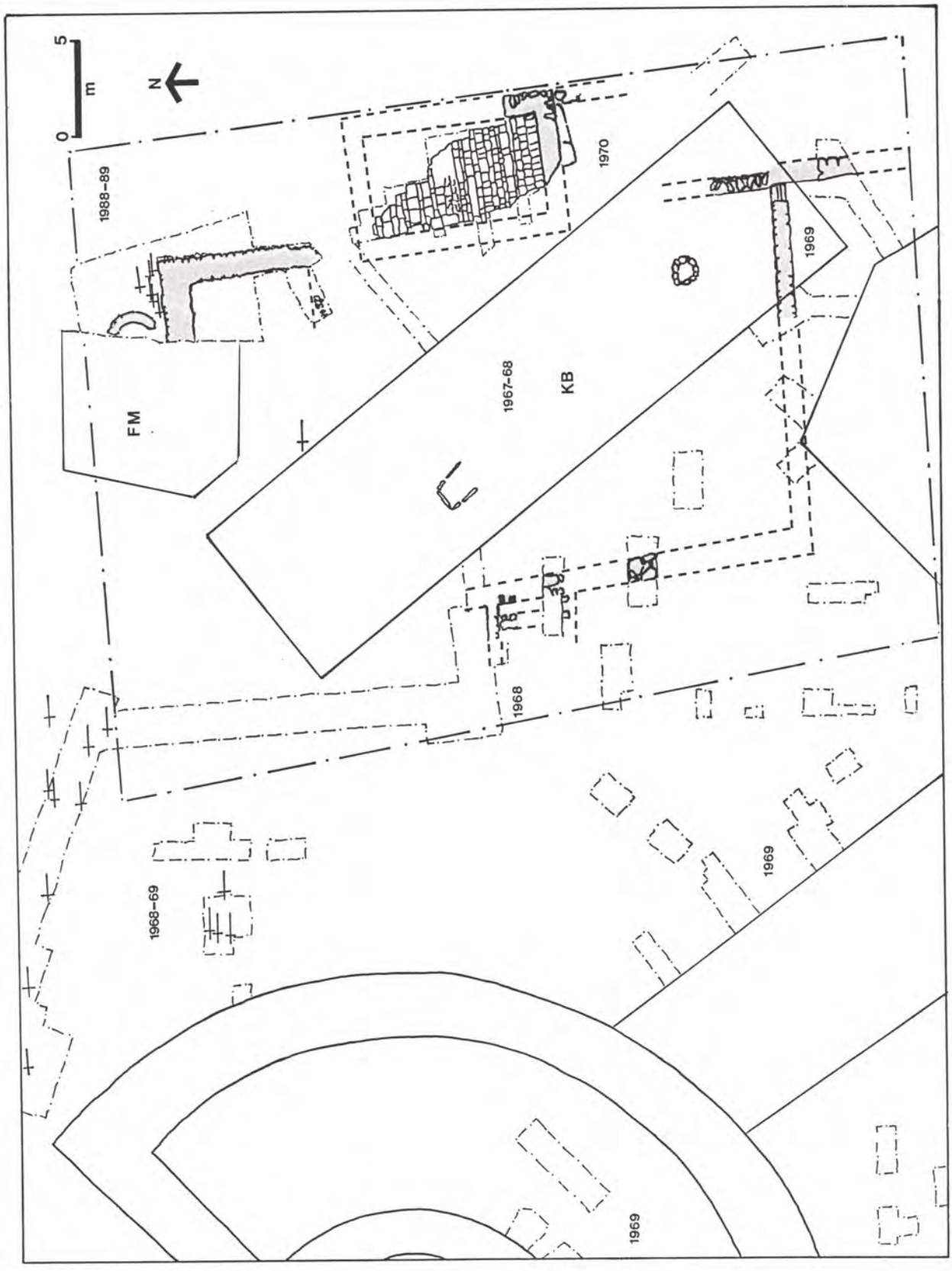

Fig. 8. *Munkholmen excavations 1968-1989 and the remains of the monastery. The **graveyard** is situated to the N. and W. of the subsquare **cloister garth**. The **church** (E. end found in 1988-89) lies across the N. wing, the **chapter house** with its fine paved floor is preserved in the E. wing, and the S. and W. wings are represented by more fragmentary portions of walling. The **well** and a **flight of steps** lie in the SE. corner of the garth and an enigmatic (post-medieval?) square **stone-lined hollow** lies further N. Note the single burial (found by Digre in 1940) which possibly lay within the church. The stippled line demarcates the estimated area of the monastic enclosure (after Lunde 1977, Fig. 115). 1:250.*

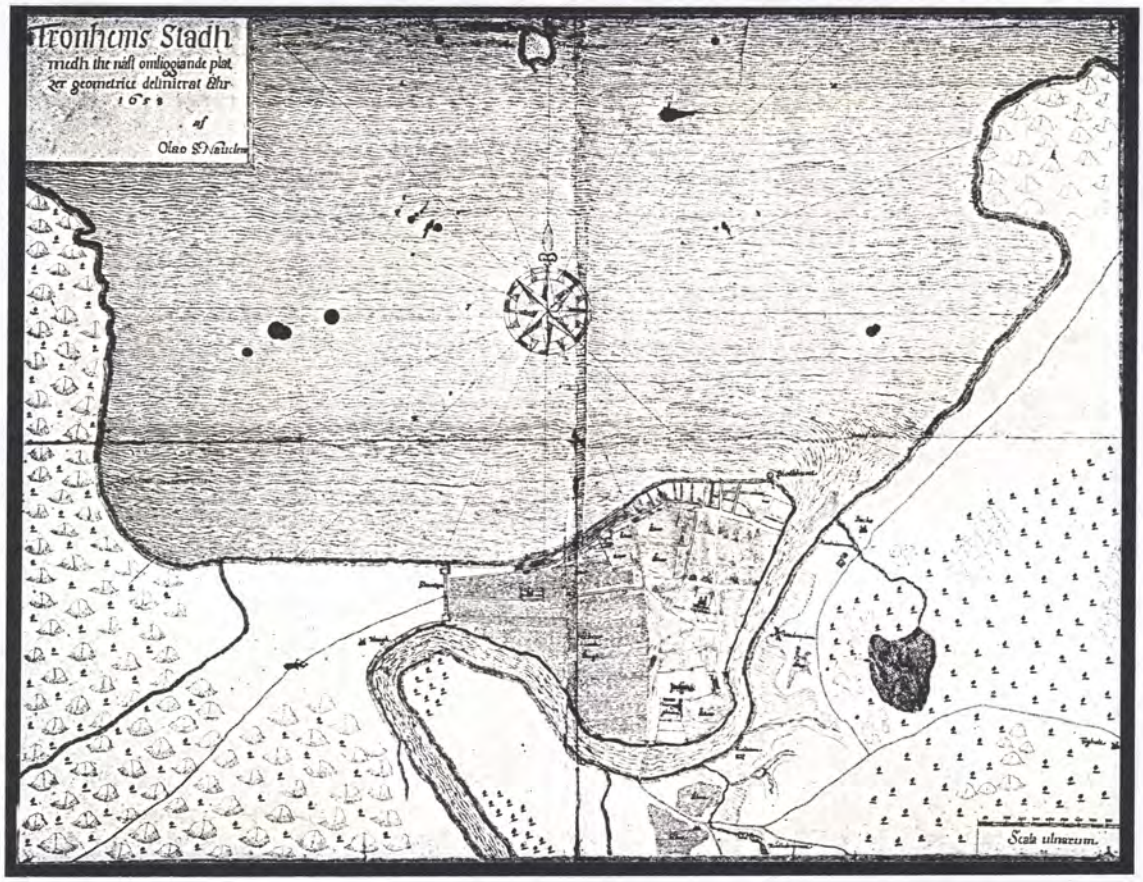

Fig. 9. *Naucler's map of Trondheim in 1658. The apparently featureless island of Munkholmen lies at the top of the drawing.*

1.5 Dates of Major Post-Medieval Building Activity.

In order to allow easier grasp of the complex post-medieval building activity which took place on the island from 1658 onwards, the sequence and character of individual building episodes is laid out below.

These events are important as they each had some effect on the excavated area in one way or another. For this compilation I have principally followed Widerberg's account, supplemented by Rösoch, Tvete and Stavseth, and Hegard.

1658 : Earthworks and a stone revetment. The above sources are somewhat unclear on who was responsible for the first defences. Rösoch and Tvete and Stavseth claim that simple earthworks ("skanser") were thrown up on the island by the Swedish army during its 7-month occupation of Trondheim, and that it was garrisoned by an officer and a few soldiers. This was overrun the same year by the Norwegians, who in turn erected a cannon battery comprising a revetment wall of stone taken from what remained of the monastic ruin. Widerberg, on the other hand, states that the Swedes never fortified the island, and that it was Major-General Reichwein of the Danish-Norwegian army who first fortified it in the aforementioned manner during the siege of Trondheim in December 1658.

1659-1661 : First perimeter fortifications in stone. Trøndelag was again under the Danish-Norwegian king, Fredrik III; large-scale fortification work began on Munkholmen resulting in a united system of bastions, with wooden buildings to house the garrison placed behind the low stone walls and timber superstructure (Fig. 10). A large workforce was recruited, and accounts show the use of equipment for stone quarrying, woodworking and earthmoving. In 1661 18

cannons were installed, increased to 26 six years later. However, this fort was **not** particularly redoubtable or impressive: according to a report by Norway's Commandant General Ahlefeldt in 1662 " the point of one bastion on Munkholmen has collapsed and it must be feared that similar will occur generally, since the wall upon which the fortification stands is only 1 foot thick and not mortared, but constructed as a dry-stone wall. The whole fortification therefore cannot bear its own cannons and even less endure those of the enemy and would therefore be better described as a coupe-gorge rather than a fortress". The first, wooden, commandant's residence (kommandantboligen) and soldiers' barracks were built in 1659. The "poorly-built" insubstantial dry-stone walls and some wooden buildings (some were demolished in the 1670s to make way for the cannon tower) stood decaying for c. 30 years before major rebuilding was begun in 1689. The original walls were eventually replaced in 1689-90, the wooden buildings by 1695 (see below). Meanwhile, fortification work did proceed during this intervening period with the building of the round tower and its curtain wall:

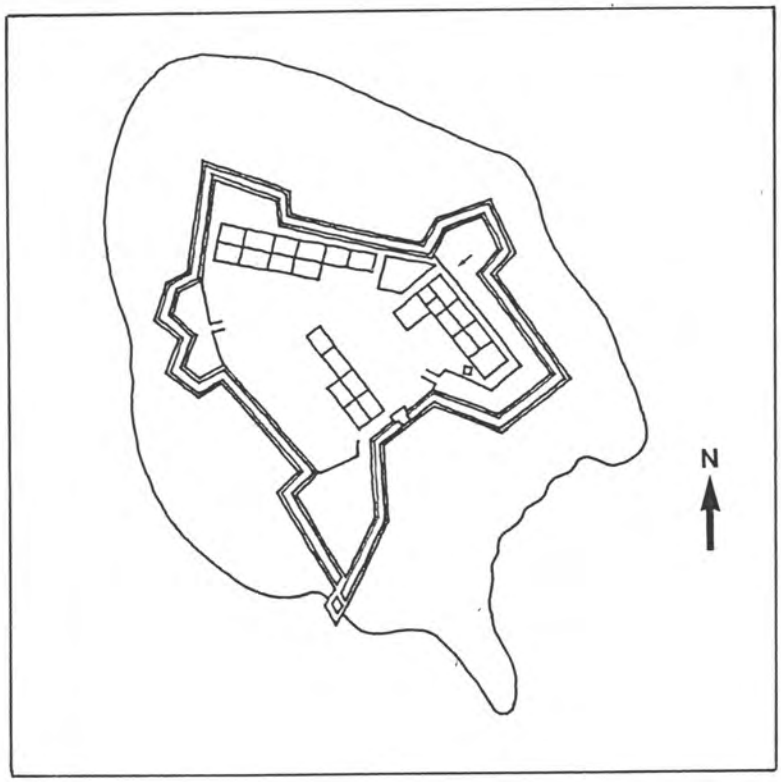

Fig. 10. *The first perimeter stone defences and wooden buildings 1659-1672 (after Fig. 2 in Widerberg, 1936). 1989 excavation arrowed.*

1671/2-1674: **Round tower and curtain wall.** The round stone-built cannon tower was begun, though not fully completed due to lack of funds (Fig. 11). Some of the original wooden buildings built within the island's interior a few years previously disappeared to make way for the new stone structure. Stone for it was transported in at some considerable expense from the ruin of the fortress on Steinvikholmen, and also from nearby Ila, Digermulen and Hommelvik. Brick was imported from Holland. Timber and mortar was delivered by farmers and traders in Trondheim and its vicinity. Interior modifications occurred in 1835. The curtain wall encircling the tower was c. 3m thick. Between it and the inner tower stood a number of wooden buildings housing provisions and soldiers.

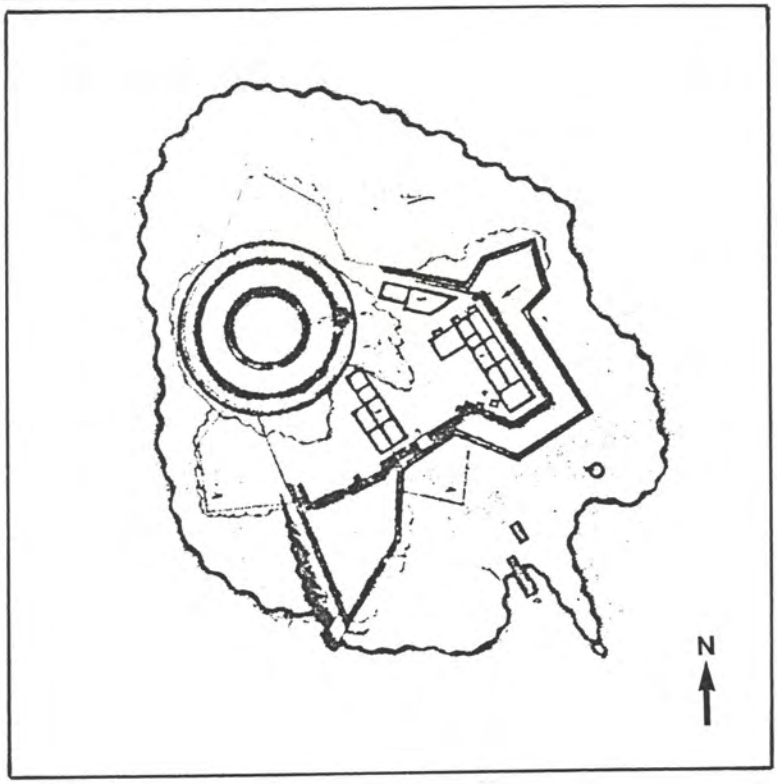

Fig. 11. *The round tower inserted, and the defences 1672-89 (after Widerberg's Fig. 3). 1989 excavation arrowed.*

1689/1690 - 1707: Second perimeter fortifications in stone. Generals Coucheron and Cicignon, in their plans for the reorganization of Trondheim's defences in 1681, did not envisage any radical alterations to Munkholmen's existing fortifications, maintaining the line of the existing walls and simply adding two batteries near the tower. During the mid 1680s local military commanders were complaining that drastic reconstruction of the outer wall was needed; parts were ruinous and in disrepair. The wooden parapet was rotten throughout, and the stone wall was far too low and was in need of replacement with a higher mortared wall. Major rebuilding was begun in 1689 during which the perimeter stone walling was constructed on new alignments, forming an irregular star-shaped fortress with projecting bastions (Figs. 12 and 13). Once again, stone for this building work was transported in from Steinvikholmen, though some was obtained from the island itself (from exposed outcrops and perhaps even from the old defences themselves?) and from the surrounding shoreline of the fjord. The wall stood ready by late 1690, with only the turf parapet and some backfilling of the works incomplete. In 1689 a survey records that the wall was 4.5 al (c. 3m) thick at the base narrowing to 4 al (c.2.5m) at the top. Additional outlying fortification works, including the sunken battery or ravelin to the S., were built in the period up to 1707. This high and solid outer walling with its wall-walk stood unchanged for well over a century, until major restructuring took place from 1825-1850. Meanwhile, certain changes and additions to the structures standing within the walls took place during their lifetime:

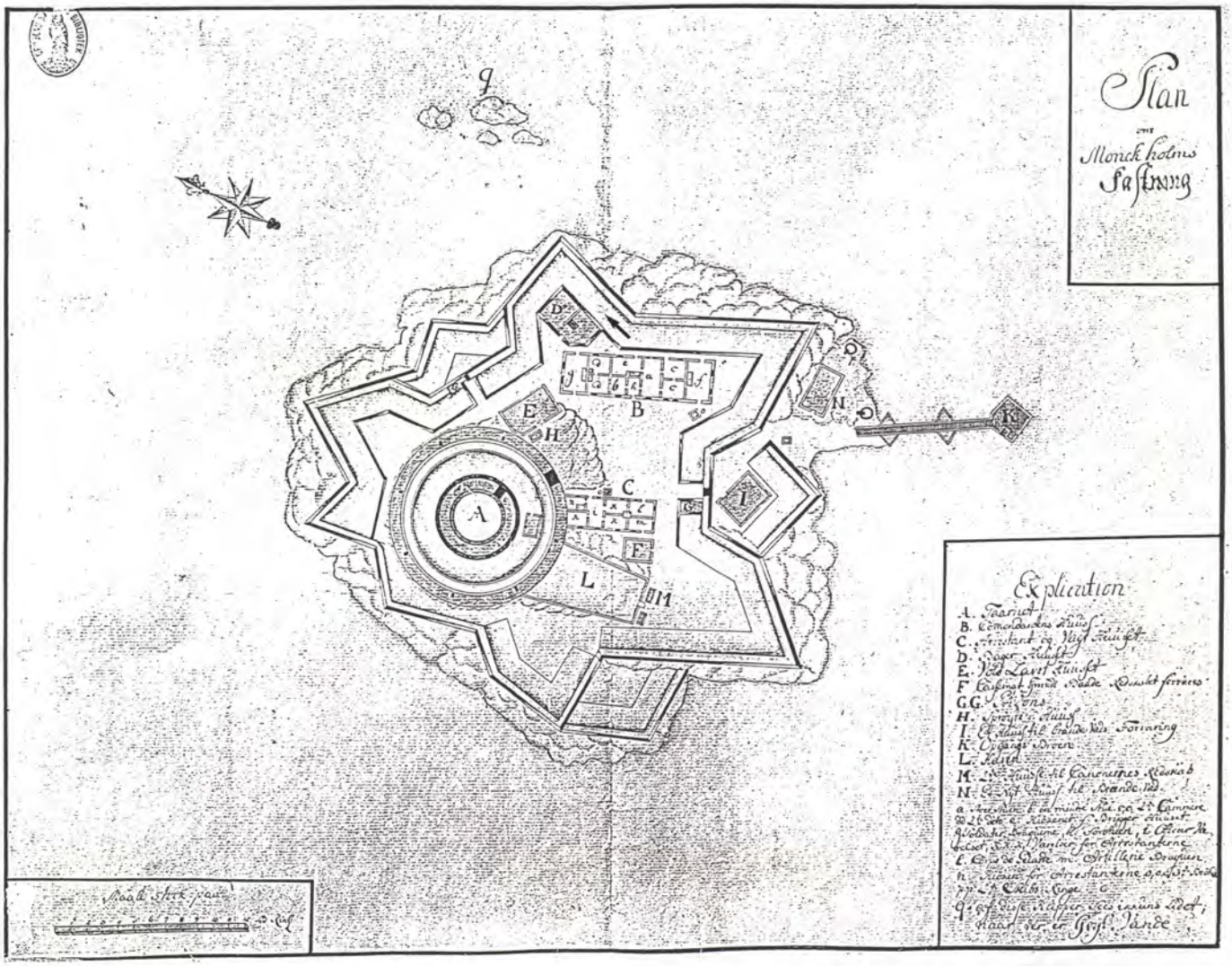

Fig. 12. *Early 18th-century plan showing the 1689-90 star-shaped bastions and the newly-built Kommandantbolig ("B") and bakery (Falkenskjoldsmessen) ("D"). 1989 excavation arrowed.*

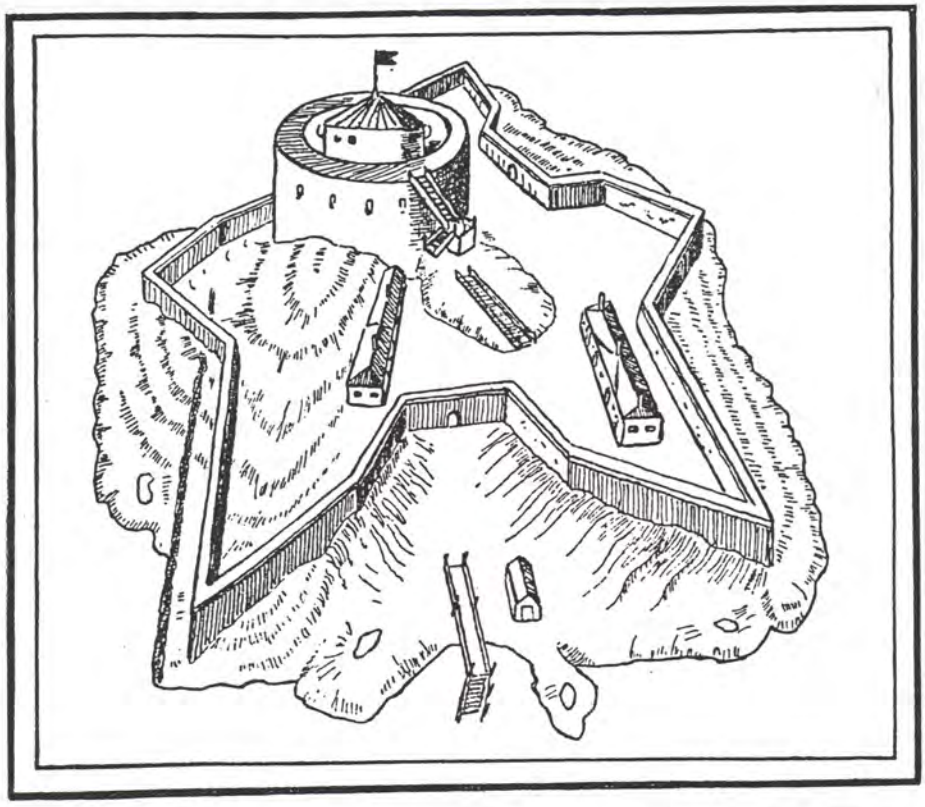

Fig. 13. *Copy of a naïve perspective drawing showing Munkholmen c. 1696. Looking N. The present excavations were conducted in the apparently empty area in the bastion behind Kommandantboligen (right). Drawing in Danish State Archive.*

1694-1695: Kommandantboligen and Vakthuset. The surviving wooden buildings dating from the construction of the oldest fort in 1659-61 were in such poor condition in 1691 that, according to Northern Norway's Commandant General Wibe, they were not fit to stand another year, and were likely to collapse during a storm. They were eventually demolished, and a new solid stone Kommandantboligen (the present one), built in 1694-5, provided a more weather-proof residence for the island's commandant (Figs. 12 and 13). This was a low, one-storeyed building, with internal wattle and brick partitions, a tiled roof and external plastering. At its eastern end it contained a small brew-/bakehouse area. At the same time, a new soldiers' barracks (Vakthuset) was built in stone just to the east of the tower, though the western end of the building, the officers' section, remained in wood until 1733 when it was demolished and replaced with a longer stone portion which extended a now completely stone-built Vakthuset westwards to join with the tower's curtain wall.

1710: Falkenskjoldsmessen. A partly subterranean stone- and brick-built brew-/bakehouse was built close to Kommandantboligen's NE corner within the area behind "Gyldenløves" battery/bastion (Fig. 12). This is the same building as that known today as "Falkenskjoldsmessen".

1775: Falkenskjoldshus. The pre-existing stone building (today's "Falkenskjoldsmessen") of 1710 was now added to: an upper storey was built above it, "lafted" in wood. This was known as "Falkenskjoldshus". It was dismantled in 1832 and sold at auction. The name has stuck to the surviving older brew-/bakehouse which formed its ground floor.

1808: Two-thirds of the curtain wall to the W. of the round tower was demolished.

1825-1850: The third, and final, perimeter defences in stone. The star-shaped bastions disappeared beneath a new polygonal outer wall, higher and sturdier and with a broader wall-walk (Figs. 2 and 3). This forms the present walling. In 1850 the fortress possessed 60 cannons and could accommodate a garrison of c. 500 men, and comprised one of Scandinavia's strongest coastal fortresses.

1940-1945: World War II. In 1940 the German Army undertook certain modifications. Six heavy static guns were installed, and the tower was used as the emplacement for anti-aircraft guns. Various other structural activities took place all over the island, including the construction of a self-contained water catchment system, with ducts and a cistern.

1966+: Major repair and maintenance work of the standing buildings. Archaeological excavations 1967-1970 and 1988-89 (Fig. 8).

2. THE EXCAVATIONS: THE ARCHAEOLOGICAL DATA AND ITS INTERPRETATION.

2.1 Introduction to the site phasing and dating

The following comprises an interpretative account of the sequence of deposits and constructions representative of activity within the area to the E. of Falkenskjoldsmessen (FM). The site stratigraphy has been subdivided into a coherent sequence of successive depositional and/or constructional events or episodes. Each of these so-called **phases** may be represented by a single component or a collection of interrelated structures and/or deposits which appear to define activity in some way distinct from activity preceding or following upon it. Each phase can include any one or a combination of elements relating to the construction, use and destruction of particular structures, or layers whose deposition occurred independently of the particular structural activity caught within the area covered by the excavation.

Each phase's account contains brief descriptions of the layers and structures contained within it, as well as their interpretation and the arguments for their interrelation. A more detailed objective account of the stratigraphical information has been compiled and is stored in the site archive. For fuller descriptions and discussion of the character and architectural-historical significance of the structural remains, see the next chapter. Each phase is illustrated with a plan and photographs. The **matrix** (Fig. 14) and relevant **profiles** (Figs. 15 and 18) should also be consulted, as should the **table of finds** (Appendix I).

With such a partial and disjointed view as was afforded us on this site, this phasing remains open to future revision in the light of further excavation and research. That said, the main stratigraphical divisions seem to be reasonably clear, although both their relative and absolute dating present problems. The phasing is constructed from the bottom up - from earliest to latest. Where available, the relevant dating evidence for each phase is presented. This consists principally of pottery sherds: a full pottery report, which also includes a wider discussion of previous finds on the island, is included in Appendix II.

2.2 Phase I (Figs. 16 and 19)

The first building phase and earliest excavated graveyard level. The walling **20** was founded directly on bedrock **74**, which was itself possibly artificially planed-off to provide a more level surface. To the E. and N. of the portion of square-ended building represented by **20** the lowest graveyard layer encountered during excavation was deposited up against standing **20**. This comprised redeposited beach gravel, **67**. Given the eastward fall of bedrock, it is likely that this material was formerly retained by a wall in order to achieve a level surface. This wall probably formerly lay well to the E. of the excavation area; however, if the stump of walling **83** mortared onto the E. wall of **20** is an early feature (which it is impossible to prove), it may conceivably represent the remains of the southerly return of such a former boundary wall (Fig. 20). However, an intuitive guess is that this fragmented stump is a later feature.

Some of the skeletons encountered in the lower graveyard level, **67**, may derive from this earliest recorded period of the graveyard's use (others, or all, may of course date from later use: skeleton **81** cut the foundation trench for the apse - see matrix). The deposition of this graveyard material may be contemporary with the earliest use of the building formed by **20**, although, as stated the area to the N. was not excavated down to bedrock, while to the E. the material was cut away at a later point in time, and consequently we possibly do not have the full sequence.

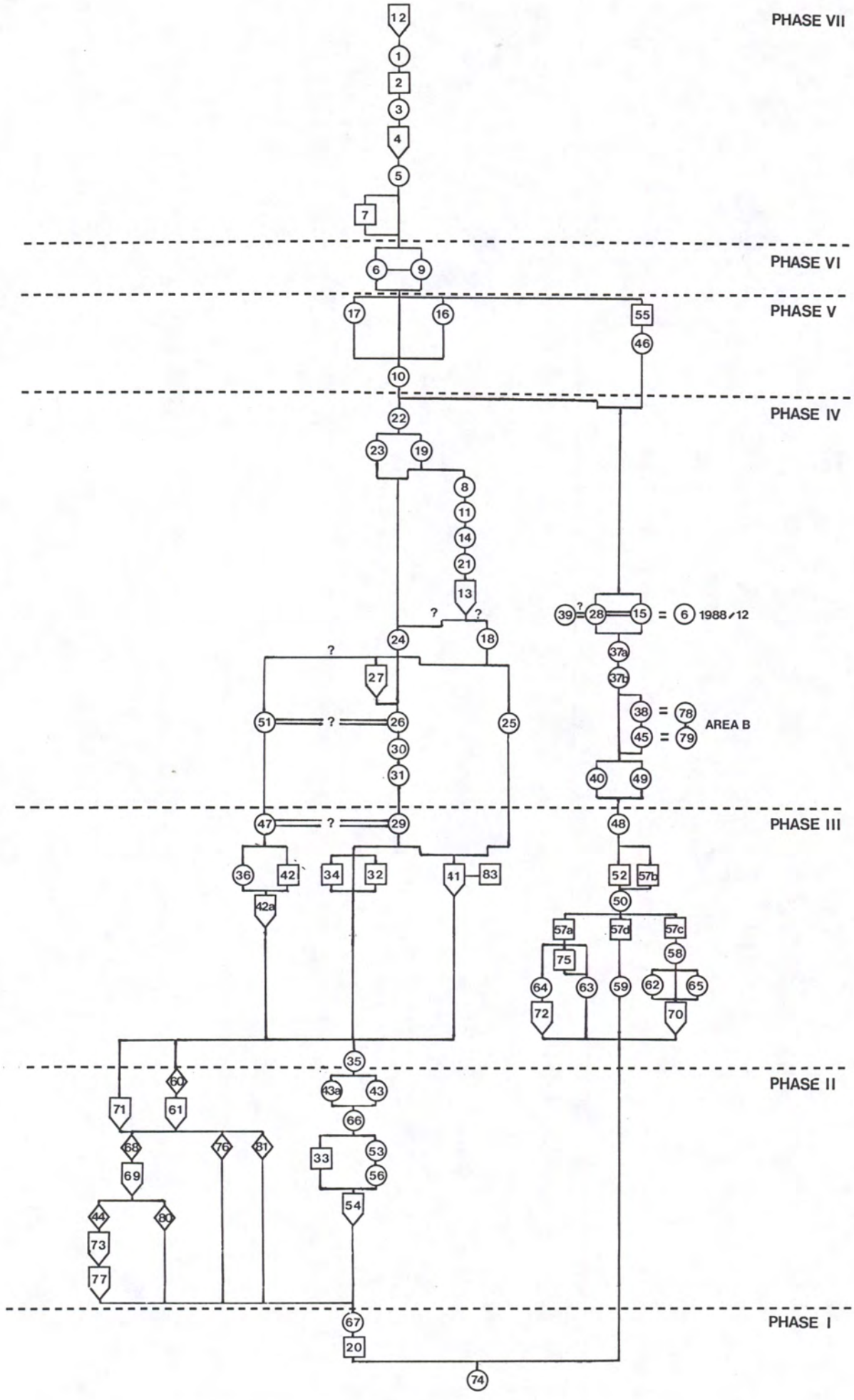

Fig. 14. The Site Matrix.

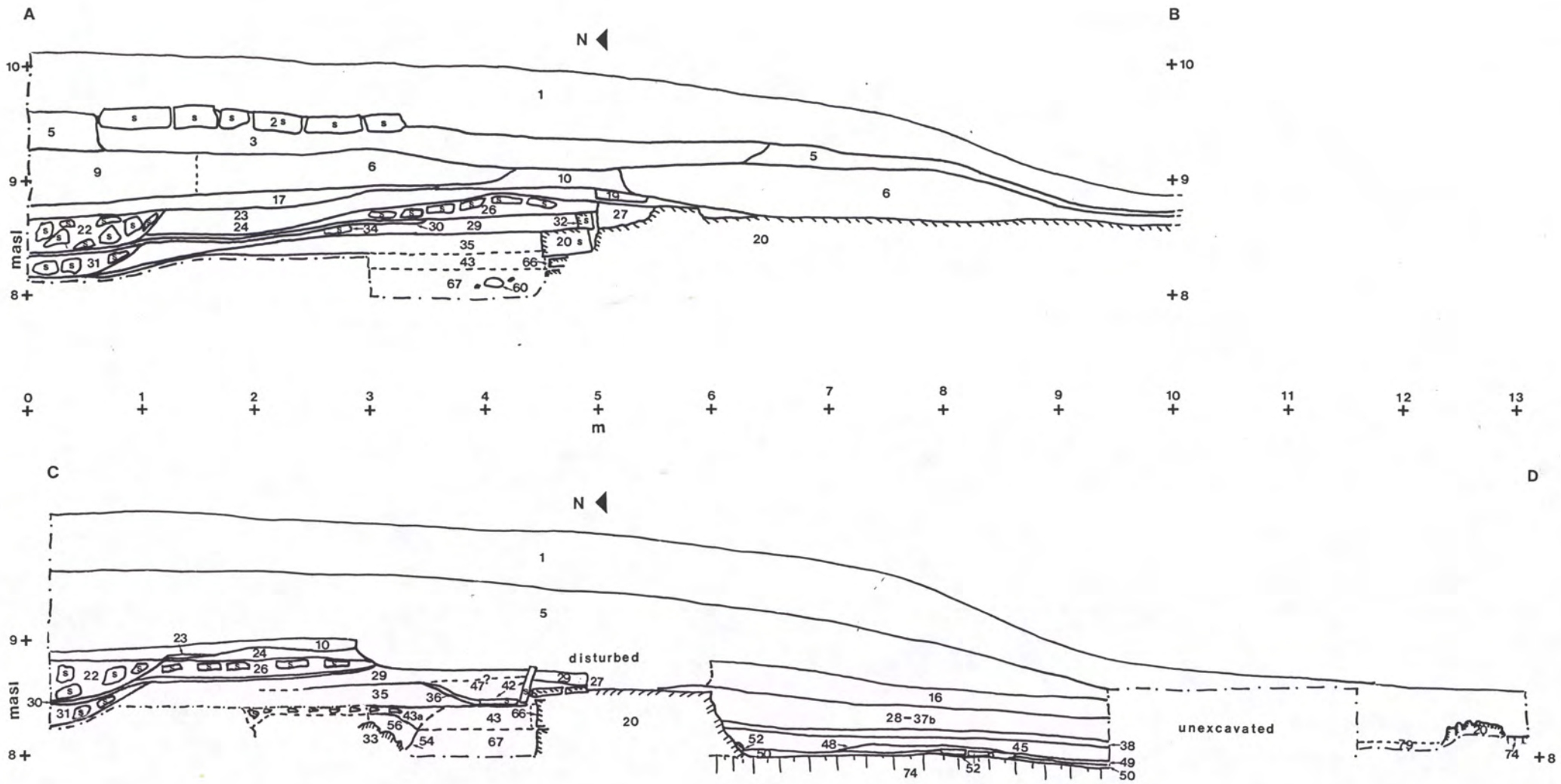

Fig. 15. *a. Profile 1. Reconstructed mid-site section profile A-B (see Fig. 6). 1:50.*

b. Profile 2. Reconstructed mid-site section profile C-D (see Fig. 6). 1:50.

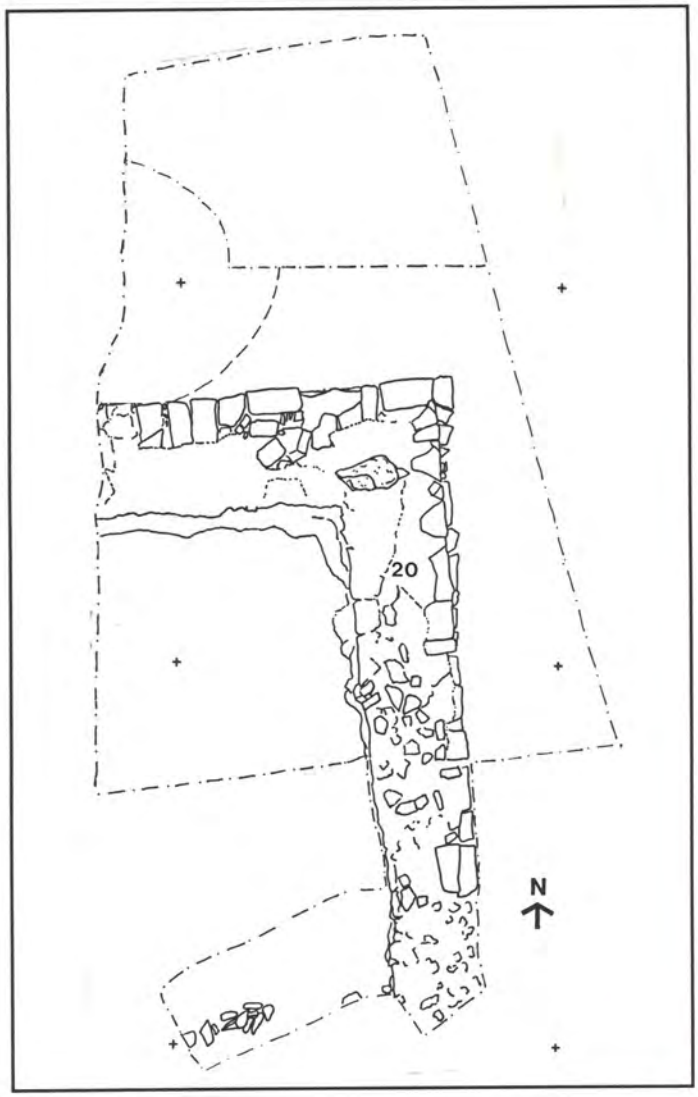

Fig. 16. PHASE I. 1:100.

The walls **20** form part of the primary structure detected on the site, a building which can be interpreted unequivocally as the medieval monastery church, here represented by the easternmost portion of its square-ended chancel. Any contemporary deposits and structures (e.g an altar base) which might have lain within the chancel were removed as a result of later clearance and re-use (Phase III). The patches of mortar encountered on the surface of bedrock here may indicate the former presence of a mortared stone foundation for a raised stone floor for the chancel (note the stone and mortar foundation beneath the chapter house floor). That the floor stood some 40cm above the level of bedrock is also possibly indicated by the fragmentary remains of the bottom course of internal facing stones, which lie at the level of the present exposed surface of E. wall (see next chapter).

Dating: No evidence in the form of associated datable artefacts or in situ decorated stonework was found. The building method and groundplan form the only basis for interpretation: however, in both cases, the surviving evidence is very sparse, and cannot provide a close dating for the building: the construction technique employed for the walling **20** is characteristic of developments within the Norwegian Romanesque building tradition, which covers a broad period, encompassing the 12th century and the beginning of the 13th century (following Lidén, 1976, 11). See Chapters 3 and 4 for closer discussion.

2.3. Phase II (Figs. 17, 18 and 19)

The second building phase and subsequent graveyard levels. A small apsidal structure **33** was built to the N. of **20,** its foundation trench, **54**, cutting the possibly primary graveyard layer **67**, a layer which had been deposited up against **20**, the existing chancel walls. This trench's higher stratigraphical position and the abuttal of the apse's foundation against the outer facing stones of the N. wall of **20** clearly demonstrate that there was an interval between the construction of the chancel **20** and the erection of this apsidal structure. The apse's slight deviation in orientation from that of the chancel probably also serves to confirm that the chancel and apse are independent structures built at different times. However, **20** and **33** clearly unite to form part of a functional unit (the latter as part of an extension of this N. portion of the church building), and both were standing when a fresh layer, **66**, accumulated against them above the earlier graveyard level, **67**. This earthy soil, **66**, may have been deliberately dumped here in order to raise the level of the graveyard and cover the foundations of the apse; it eventually became so disturbed by the repeated digging of graves that intact remnants of the original **66** adhere only in patches against **20** and **33**. Grave **81** at least post-dates the apse's foundation trench. The upper graveyard level, the earthy gravel **43**, was formed as a result of the repeated turning over of the graveyard (it is, in effect, disturbed **66**). The localized deposit of slate fragments, **43a**, around the base of the apse, must have formed after the deposition of **66** against the apse; this concentration possibly represents debris which accumulated around the base of the apse as a result of renovation work during its use, or even collapsed debris (roof-slates?) deposited during its dereliction or destruction?

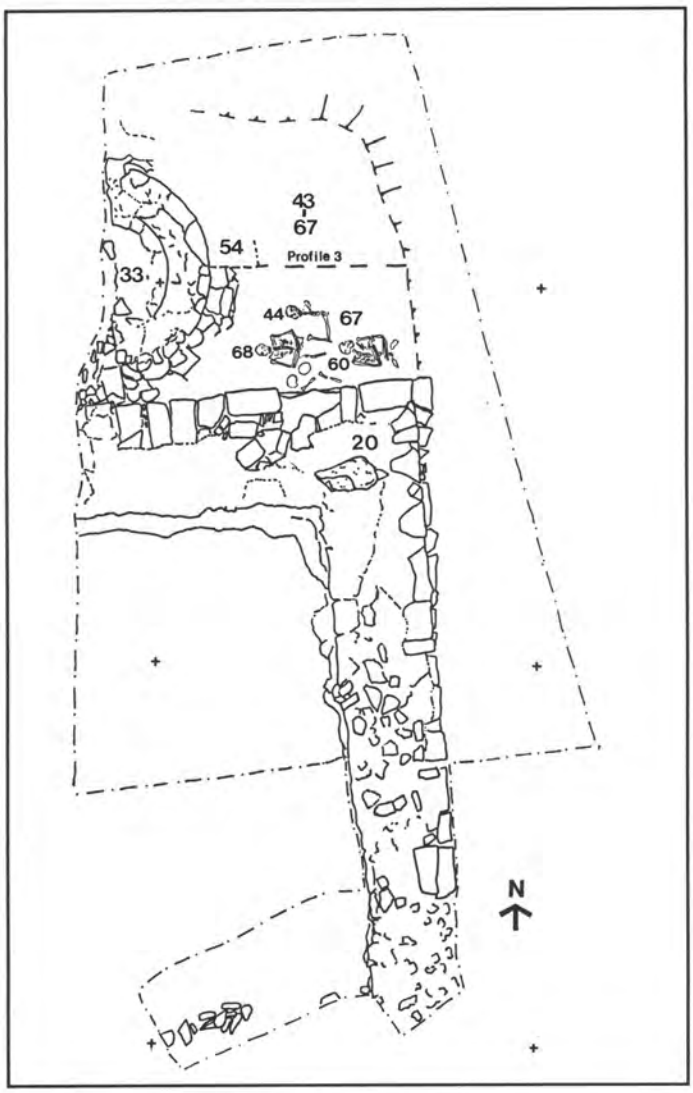

Fig. 17. PHASE II. 1:100.

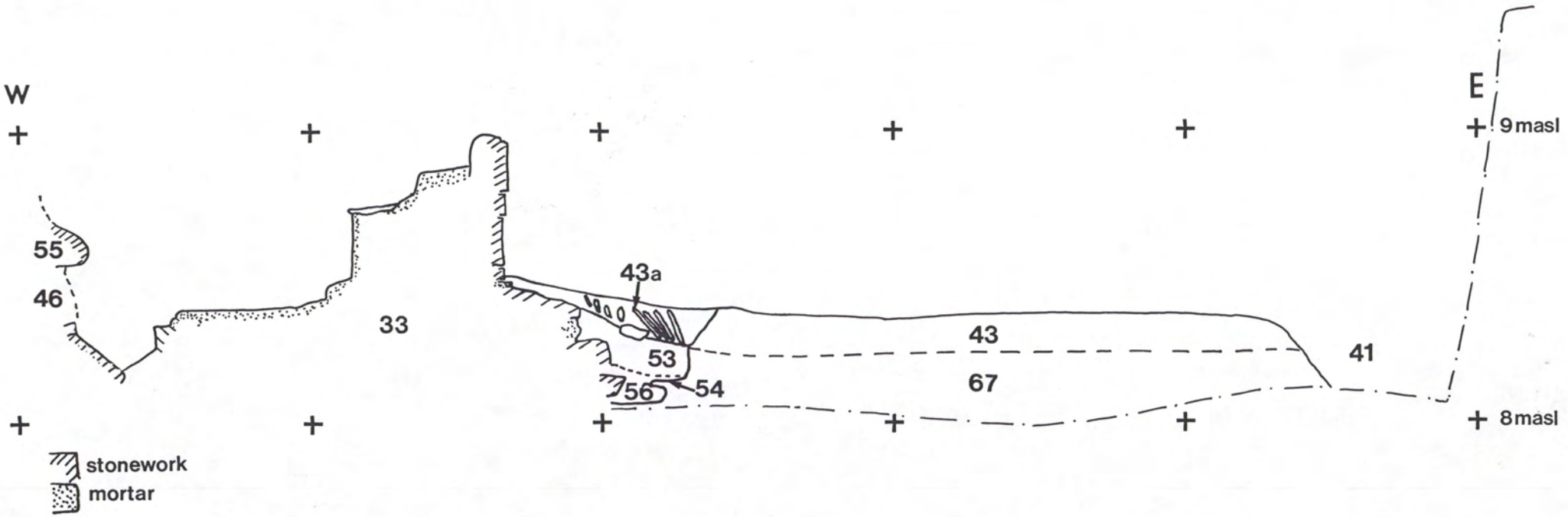

Fig.18. *Profile 3. Section cutting E-W through the apse and graveyard from Falkenskjoldsmessen to the edge of excavation (see Fig. 20). 1:20.*

Fig. 19. *PHASE II. Plate showing apse and graveyard in foreground, chancel in background. Falkenskjoldsmessen to right. Looking S.*

As to function: this apse, lying against the northern wall of the church's chancel probably forms the eastern end of a side-building, in all likelihood a small side-chapel: whether it represents a later modification to the eastern end of a pre-existing side-building, or, perhaps more likely, part of a wholly new structure added at some point after the chancel was finished, is not yet verifiable. The apse's interior itself would in all likelihood have housed a side-altar.

Dating: Again, there is no closely datable artefactual or architectural evidence for this phase, though the form and method of construction of the apsidal stone structure **33** is consistent with developments in the Norwegian Romanesque building tradition of the 12th and early 13th centuries (Chapters 3 and 4). The time which elapsed between the construction of the chancel walls **20** and the building of **33** may have comprised weeks, months or years, although both came to be used simultaneously as parts of a single unit (the church). Only the graveyard level **67** intervenes between their individual moments of construction, though this clearly formed part of a likely continuum of activity which is likely to have encompassed the 12th century at least. The deposition of **66** against both chancel and apse, and its disturbance to form the upper graveyard level **43**, and indeed the inhumation of bodies in the lower level, **67**, could have taken place at any time following upon the construction of **33**, the graveyard probably being in use throughout the medieval period. Consequently, this phase possibly covers a number of centuries from at least the 12th century on, and includes the use and occupation of the locality until the destruction of **20** and **33** (next phase).

2.4 Phase III (Figs. 20, 21, 22, 23, 24 and 25)

The demolition of the medieval stone buildings and renewed activity in and around the ruin. This is a very complex phase, with a good deal of ambivalent information which can be interpreted in a number of ways. **N.B.** A **summary** is provided at the end of this section for those not wishing to grapple with the intricate argumentation.

Introduction to the character of the phase and the problems of correlation

At some point in time the walls of the chancel (**20**) and the apse (**33**) were dismantled to their present heights. This may have occurred in one short intensive episode, or intermittently and piecemeal over an extended period of dereliction. There is little archaeological evidence, at least in the form of significant deposits of destruction debris, such as mortar and stones, which can be linked stratigraphically to such a process. In addition, it cannot be shown whether the church was dismantled either immediately or long after its abandonment (in 1531 or 1537?). This is puzzling, as one might have expected that the demolition of such a substantial stone building would have resulted in the deposition of large quantities of debris. One might speculate, on the basis of this lack of debris, that the building's demolition, whether prolonged or quick, may have been conducted in such a thorough manner as to leave little material evidence in situ. Given the value placed on good building stone in the post-medieval period, its thorough and comprehensive removal from the ruin is likely, although it is strange that no directly associated mortar debris occurs. The first significant spreads of mortar and small stone fragments demonstrably occur after the N. wall of **20** was dismantled to its present level and a humusy soil (**29**) had encroached over it (see Level 2, below). This humusy soil therefore seems to represents a hiatus, or break, between the dismantling of the walls and the first significant deposition of mortar and stone debris. Consequently, the date and duration of this hiatus (when the chancel, and presumably the whole building lay at its present level) are crucial to any understanding of the historical events here.

The dating of this destruction and ensuing hiatus is far from secure, and a further complicating factor is that the lack of directly correlatable debris from the walls' destruction may have resulted from post-depositional removal and redistribution to other areas, where it was used for levelling-up, for example. That material has travelled around the island is evident, and it may even be that the spreads of mortar and dumps of stone encountered at a higher stratigraphical level above the already demolished ruin represent debris which originated from the building but which has been redeposited over and over again, eventually returning to the immediate area (see next phase).

A central problem is that actual physical correlation of deposits inside and outside the chancel was not possible at this stage. This resulted partly from the effect of later disturbances, although, as will be argued below, this discontinuity is in itself perhaps indicative of the differential nature of post-destruction activity here, with possibly contemporary activity and deposition taking place to N. and S. of the demolished N. wall of the chancel, to either side of a now only inferrable secondary division along the same structural line.

The nature of the main stratigraphical components

The phase begins with layer **35** (**Level 1**), at which stage the chancel (and presumably the rest of the church?) was either undergoing demolition or was already demolished, and ends with the formation of the aforementioned humusy soil (**29**) over the former graveyard and the N. wall of the chancel (**Level 2**). Between these deposits occur traces of a number of structural activities, both inside and outside the chancel walls, all of which, it is suggested, must have taken place when the chancel could still be seen, though whether it was then still a substantial standing building or an almost completely demolished ruin is open to debate.

The digging of the right-angled ditch (**41**) into the surface of **35** to the north of the chancel may have taken place close to the time of demolition, as both it, the graveyard and the ruin are sealed by the same layer (the humusy soil, **29**). Further activity, in the form of the erection in the chancel's demolished shell of a dry-stone wall (**35**) and one or two probably contemporary wooden floors (**57** and **52**), must, however, have definitely taken place when the walls were down to their present height.

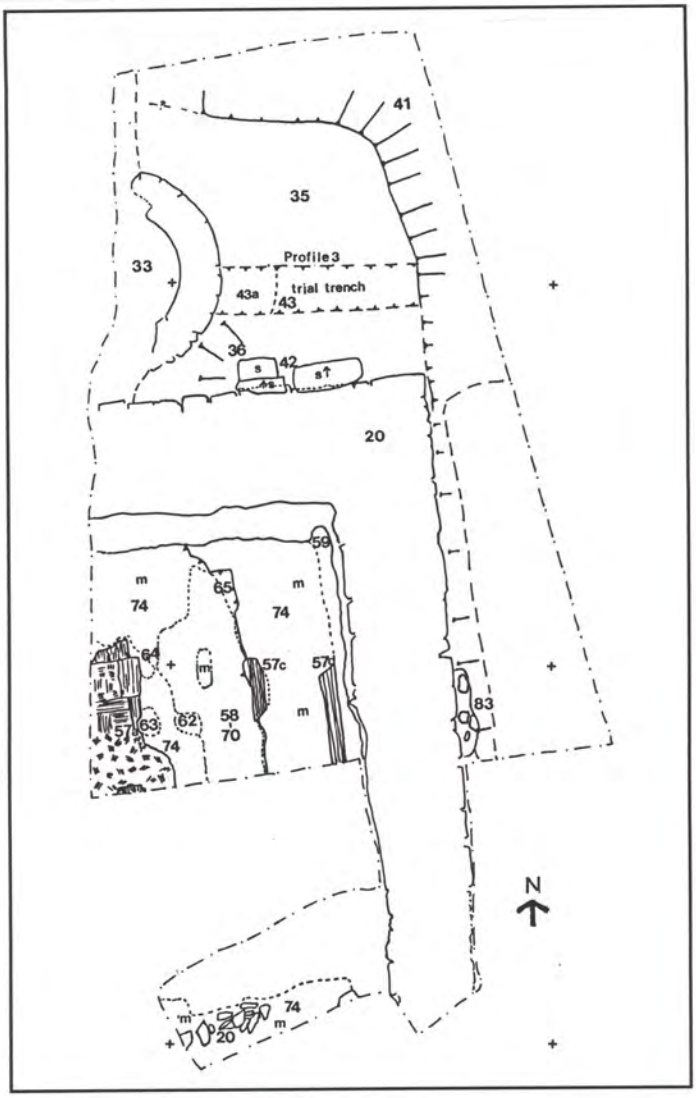

Fig. 20. PHASE III (Level 1). 1:100.

The archaeological evidence **outside the chancel** is as follows: **35**, a gravelly brown soil with occasional mortar and tile fragments and soapstone chips forms the only major deposit correlatable with the demolition of the walls. This seems to form the disturbed upper part of the upper graveyard level proper, **43**, intermingled with scattered debris resulting from either a prolonged period of dereliction and dismantling or a single episode of demolition of the walls **20,** and probably **33**. Cutting **35** was **42a**, an elongated depression alongside the N. wall of **20**; its digging resulted in the redeposition of some of **35** onto the exposed surface of the demolished wall, and this and the important evidence supplied by the deliberately-set stone slabs **42** clearly demonstrate that by the time this hollow was dug into the surface of **35**, the N. wall of **20** had to be at its present height. Furthermore, two large stones in the upper course of the chancel's N. wall had evidently slipped slightly out of position by the time the subsequent humusy soil **29** accumulated over its line. These stones may have have been shifted out of position during the actual demolition of the walls, or, alternatively, they may have slipped during a longer period of post-destruction dereliction during which the walls were at their present level for some time prior to the deposition of **29** soil.

Fig. 21. *PHASE III (Level 1). Plate showing the emptied chancel. Looking SW.*

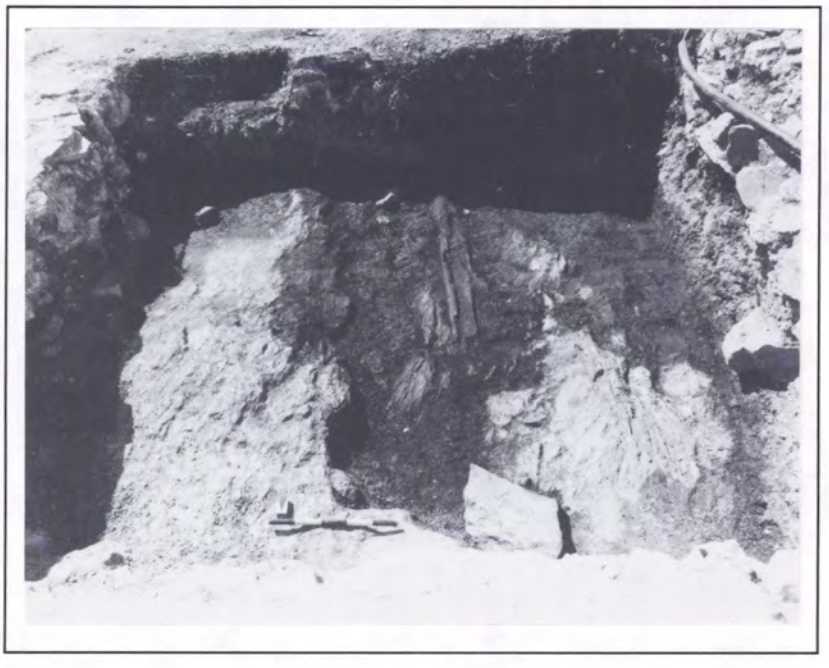

Fig. 22. *PHASE III (Level 1). Plate showing the possible remains of a first floor inserted into the cleared-out chancel, and the cleft in bedrock containing a charcoal deposit, subsequently ^{14}C dated. Looking S.*

Although no direct correlation can be demonstrated, the stratigraphical position of the right-angled ditch **41** may place its excavation at a point in time when the church was either still standing, in the process of demolition, or already dismantled. The crucial factor here is how long a period of time layer **35** represents: since it forms the only surviving layer which can have existed during the destruction of the church, this represents a potential period of c. 130 years. Consequently, on stratigraphical grounds alone, the church could have been dismantled and the ditch dug at any time during this layer's apparently long "lifetime".

One thing does seem clear, however: whoever dug these ditches (**41** and **42a**) must have been able to see the outline of the chancel, and also that of the apsidal-ended side-building, since they evidently took the walls into account during their digging activities. The right-angled ditch **41** in particular respects the line of the eastern chancel wall, maintaining its line north before swinging west to possibly join up with the (inferred) line of the projecting north-east corner of the side-building of which **33** formed the eastern end. This further conveys the impression that the church may still have been visible to some extent at the time this ditch was dug, although **42a** cannot have been dug except either during or just after the time the chancel underwent demolition.

Apart from **35** and the right-angled ditch **41**, all other layers and features on and to the north of the chancel's N. wall clearly post-date that wall's demolition (Level 2). However, the same cannot be asserted in connection with the apse **33** whose sealing deposits were largely removed during the construction of the later brick-built duct **7**. It is possible that this structure survived to a slightly higher level allowing later deposits to form against it, though this is probably unlikely. The accumulation of a soil (**51**) similar to **26** (or possibly **29**) in a void left by the removal of one of the apse's stones seems to indicate that there was no significant interval between the demolition of **20** and **33**.

Such is the evidence to the N. of the chancel in the former graveyard area. Little evidence in the form of stone and mortar debris occurs, and the digging of the main feature here, the ditch **41** cannot be placed stratigraphically before or after the demolition of the chancel walls to their present height.

As pointed out, the lack of direct correlation between layers and features N. and S. of the N. wall of **20** makes it impossible to physically connect the evidence for activity inside and outside the chancel. The fact that the interior of **20** was thoroughly cleared out at some stage (though whether before or after the dismantling of the walls cannot be demonstrated) of course denies us insight into activity there prior to that clearance. To compound matters, it seems likely that much of the deposition which took place within **20** occurred independently of deposition to the N. and E. of the walls. It is only at a relatively higher stratigraphical juncture that direct physical correlation of layers across the top of **20** can be made (Phase IV). This may infer that deposition occurred at different times on either side of the walls, or, alternatively, that the deposition of dissimilar deposits occurred simultaneously internally and externally. In both instances this cross-wall discontinuity is suggestive of the presence of some kind of physical division between these areas. If the N. chancel wall was at its present height, this raises the likelihood of there having been a secondary structural division along its length. However, it might equally be the case that the radical excavation of the interior of **20** in antiquity may have removed earlier deposits which were contemporary with the deposits and structural remains to the N. which form the basis of this phase.

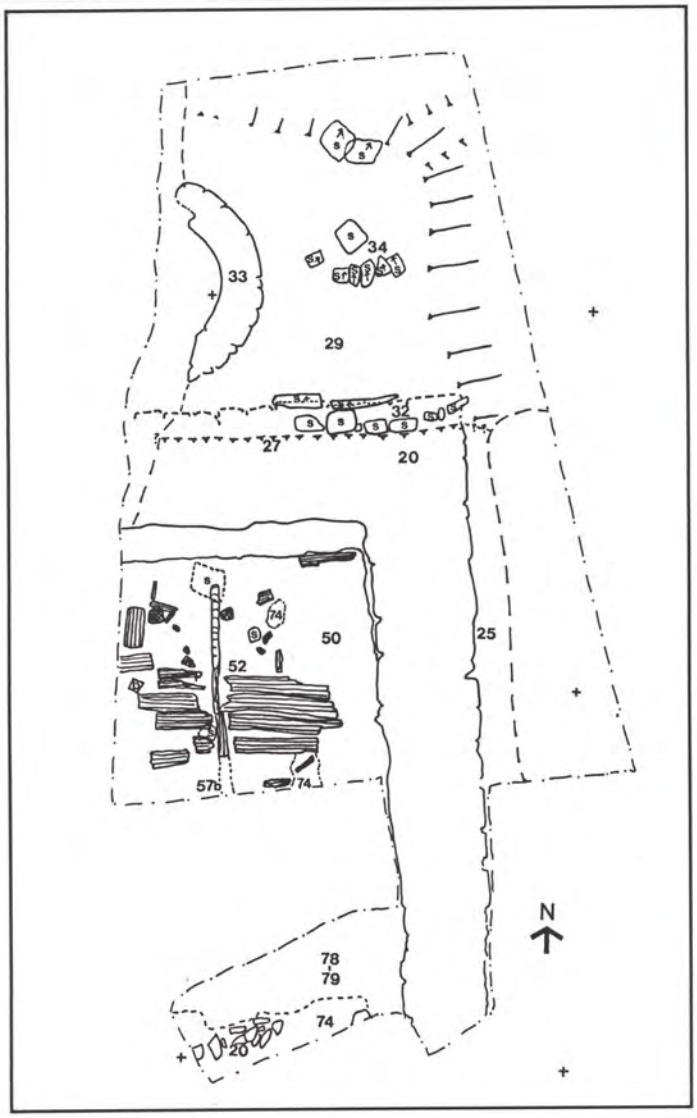

Fig. 23. PHASE III (Level 2). 1:100.

The case for simultaneous activity inside and outside the church ruin

Despite the aforementioned stratigraphical discontinuities, it is possible to make a case for simultaneous, though differentiated, activity to either side of an inferred secondary division, in the likely form of a dry-stone wall (**32**) placed directly on the demolished N. wall of the chancel. The sequence across the site is as follows (some repetition is required to establish this proposed scenario):

Level 1: As stated above, the dismantling of the stone walls of **20** appears to have taken place leaving no dense in situ accumulation of destruction debris. The N. wall of **20** was dismantled down to what must have been the exposed ground level at the time (layer **35**), a disturbed portion of the upper graveyard level containing some scattered debris possibly deriving from the demolition (and/or possible long-term dereliction?) of the ruin. **43a** may also date from that phase of dereliction and/or demolition. The ditch **41** cuts **35**, and must have been dug while the walls could still be seen. The ditch-like hollow **42a** may have been dug during or just after their demolition, its primary fill **36** perhaps deriving from that process, although the stone slabs **42**

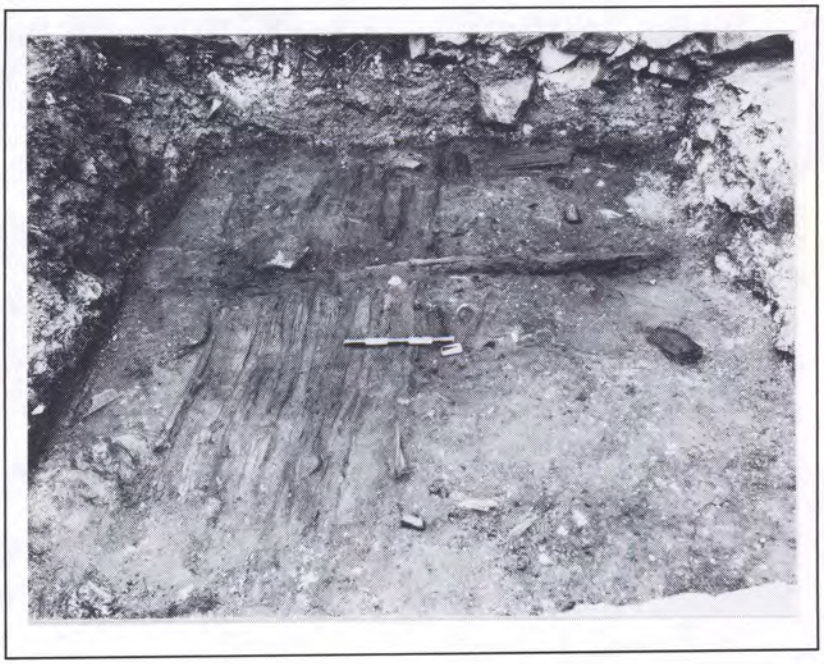

Fig. 24. *PHASE III (Level 2). Plate showing the fragmentary planks and joist of the second floor inserted into the cleared-out chancel. Looking W. Note the occasional scattered charred wood fragments (remnant burnt roofing?).*

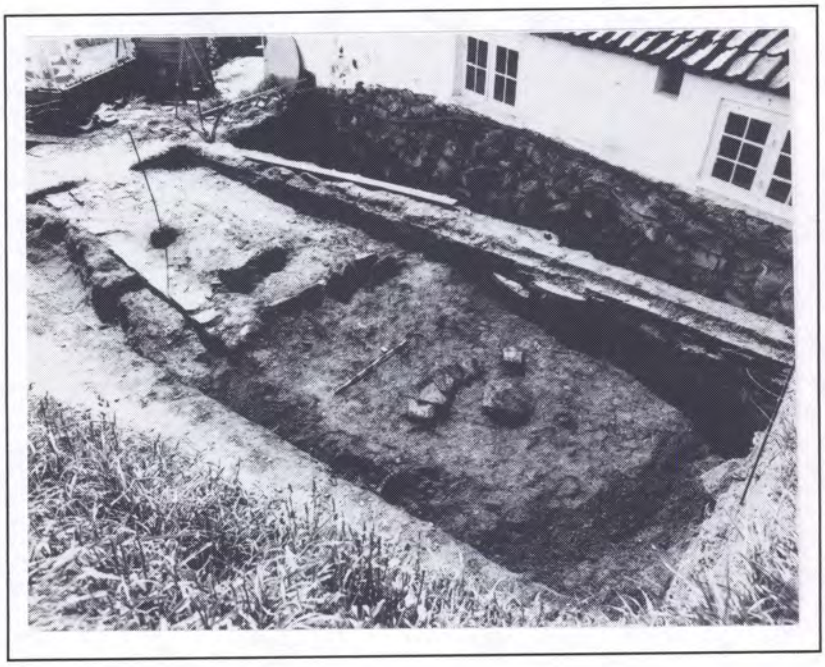

Fig. 25. *PHASE III (Level 2). Plate showing the line of the ditch* ***41****, the humusy soil* ***29****, the arc of set stones* ***34****, and the row of stones* ***32*** *along the edge of the chancel's demolished N. wall: remains of post-medieval dry-stone walling? (the chancel interior is out of phase in this picture). Note also the apse appearing under the modern duct* ***7*** *in background. Looking SW.*

which were set in the open hollow must have been placed there after the wall was down to its present height. The stone slabs looked suspiciously like simple grave slabs, perhaps dug up during either the digging of this ditch or some other part of the graveyard (or, perhaps during clearance of the church interior?). The lapse of time between the digging of **42a**, the deposition within it of the mortary soil **36**, and its clearly deliberate partial lining with the stone slabs **42** is likely to have been short, and it is difficult to avoid the conclusion that this lined hollow was purpose-dug. When viewed with the associated evidence for renewed structural activity along the old wall line, it is tempting to interpret it as some form of attempt at drainage (see below). As pointed out already, with the redeposited **35**, and most particularly, the slipped stones in **20**, these slabs' position form important evidence for the fact that **20** was already demolished to this level before the formation of the soil **29**.

Level 2: 29, a soft brown humusy soil, covers the open former graveyard (now clearly out of use) and extends into the ditch **41**, and possibly, as **47**, into the hollow lined with slabs **42**. This accumulated against **32**, a row of stones which were placed directly on **20** (and partly on up-cast **35**), and around a rough arc of stone slabs, **34**, set on the disturbed surface of the former graveyard, **35**. These are admittedly highly fragmentary remains, though it can be argued that their positioning and arrangement are not fortuitous and that they probably represent the remains of the first flimsy stone structures built here following the dismantling of the medieval walls to their present level. The alignment of the stones **32** in such a way as to closely follow the N. edge of the earlier wall **20** clearly demonstrates that whoever placed them here could see the stump of walling quite clearly and used it deliberately as a foundation for this loosely arranged dry-stone construction. That in fact the line of **32** represents all that remains of a formerly somewhat higher and broader dry-stone wall may perhaps be supported by the presence, in the ensuing deposit, **26**, of a dense scatter of stones which, it is argued, forms collapsed debris from these simple dry-stone structures (Phase IV, Level 1, Figs. 26 and 27). In addition, an elongated depression, **27**, along the S. edge of **32** is interpretable as a void, or gap, left following the removal of stones associated with **32**, probably the same stones thrown down to form, with a brown soil, layer **26**. This layer was heavily admixed with soft creamy flecks of mortar, though the stones themselves did not appear to have mortar adhering. Consequently, the layer perhaps contains evidence for simultaneous destructive and constructive activity, the stones forming the thrown-down debris of earlier dry-stone structures in the locality, the mortar comprising evidence for the mixing and application of mortar for subsequent structural activity replacing the former (next phase).

With layer **26** we are strictly entering upon the next phase of activity since the collapse or throwing-down of this rubble post-dates the initial infilling of the present phase's ditch **41**, which may have been cut at round about the same time that the possible dry-stone structures **32** and **34** were erected. In the same manner as the stones of **32** and **34** are surrounded by the firm humusy soil **29**, so the right-angled ditch **41** is filled with the same material (its thinness in the ditch may result from subsequent disturbance and compression). The soil's humusy character is probably consistent with a prolonged period of stasis, although some contemporary human activity in the locality is indicated by its content of bone, charcoal, nails and metal objects.

Clearly, therefore, the chancel's northern wall (and probably its companions) was down to its present level prior to the deposition of **29** and the placing of the stones **32**. At this stage in the stratigraphy, due to intervening root disturbance and, perhaps more relevantly, the inferrable presence of a former barrier between the areas (the dry-stone wall **32**), it is not possible to physically correlate layers inside and outside the area formed by **20**. In the absence of any direct correlation, an intuitive reconstruction of events to either side of the wall must be made. The character of the remains and the associated finds material do combine to allow some tentative speculation about the nature and the relative chronology of events to either side of the inferred

division. It is proposed that the possible dry-stone wall **32** formed the flimsy N. wall of a building which re-used the demolished shell of the old medieval ruin as its foundation, and that this, combined with evidence for flooring and the secondary plastering of the partly denuded internal faces of **20** together form contemporary elements in a structural unit - namely a timber-floored shack or hut (Norw. skur) of somewhat primitive character.

Inside the former chancel, the remains of possibly two levels of timber flooring were found. These sealed deposits within holes and fissures in bedrock, one of which produced a sample of charcoal (see Dating). The lowest floor level (Fig. 20) was very poorly represented: **57** comprised two isolated planks as well as a patchy extent of compressed organic material, possibly additional wooden planking. This lay under **52**, a rather more certain level of flooring. Intervening between these floor-levels was a brown mortar-flecked greasy soil, **50**. Above the upper flooring elements, which were fragmentary, lay a thin discontinuous silty sandy deposit with debris, **48**, itself sealed by a series of banked-up dumps of soil and mortar, **40 - 37a**.

A sequence of at least six distinct structural and/or depositional events are represented within the emptied chancel: the formation of a charcoal-laden deposit in a (naturally formed?) cleft in bedrock, with some slight evidence for a more widespread burning of mortar residue on the surface of bedrock; the laying of a possible floor, the patchy remains of which rest on bedrock, and the (simultaneous?) whitewashing of the denuded(?) interior of the N. wall of the chancel; the accumulation of a brown soil with mortar and the deposition of a coin and potsherds within it; the establishment of a joisted plank floor; its neglect or destruction, the accumulation on its fragmented surface of a thin silty deposit implying that the area perhaps lay open to the elements, or was at least deserted, for some time; and finally, the wholesale dumping, in a single event (as implied from cross-fitting sherds), of soil and debris up against the walls.

All this evidence argues for the re-use of the possibly burnt and subsequently demolished and emptied shell of the former chancel as a simple roofed shelter, or shack. Exactly when the shell was emptied and when it was re-used as the basis of such a shack are difficult to pinpoint accurately. Likewise difficult to estimate is the length of time this shack was in use before it fell into neglect, or burnt (there are signs that it may have fallen prey to fire), as well as how long it might have stood open prior to the area being filled up with dumped soils. This problem is best left to the discussion of the dating evidence (see below). However, despite the difficulties in assessing initiation and duration of use etc., it seems reasonable to associate this plastered and floored interior with the aforementioned secondary line of walling (**32**) placed on the ruin's N. wall, walling which would have supported a roof, necessary to protect the wooden floor(s) in the interior.

Prior to the collapse or deliberate demolition of the walling of this shack (a process resulting, as suggested, in the deposition of the mass of stones in **26**) the humusy soil **29** accumulated in the open ditch **41** and over the former graveyard area, as well as up against the base of the dry-stone wall **32** and the base of a possibly similarly poorly-built indeterminate structure **34** between the wall and the ditch. The slab-lined ditch **42a**, it is proposed, may have been an attempt to provide an eaves-drip for the shack's roof. However, it may not have functioned as such for very long, as it seems to have been quite quickly filled with **47**. As suggested, the soil **29** is conducive with a prolonged period of neglect and dereliction, and when one looks at the evidence for similar decay within the shack to the S. there may be good correlation in the evidence for a somewhat neglected and derelict contemporary environment.

Dating: The dating evidence for this activity in and around the ruin is imprecise, and due to the stratigraphical discontinuities, impossible to correlate firmly.

From the graveyard area outside the chancel only one sherd of Dutch whiteware (early 17th century?) was found, in a somewhat insecure context (the disturbed surface of the graveyard, layer **35**). It would be extremely dangerous to date this layer on the basis of this alone, as it may very easily be intrusive. Unfortunately, the next layer, **29**, covering the graveyard and encroaching upon the N. wall of the chancel, produced no datable artefacts, a particularly regrettable lack as such evidence would have given us a more secure terminus ante quem for the ruin's destruction. Unfortunately, **35**'s single sherd cannot on its own play a decisive role in determining the date of deposition of either layer **35** or **29** or of the demolition of the church, although its testimony should not be ignored altogether.

The interior of the chancel produced a fair amount of datable material: A charcoal-laden deposit (**58**) lying in a cleft in bedrock produced a broad calibrated radiocarbon date-range (Stuiver-Pearson), subdivided on probability at 1 sigma into AD 1517 to 1598 (34% probability) and AD 1618 to 1677 (29% probability). Also on bedrock, though deriving from a stratigraphically higher deposit (**50**) between the two floor levels, lay a Swedish 1/4 öre coin of 1653/4 date. **50** also produced 3 sherds of 17th-century Low Countries and German redwares. Over the silt **48** which covered the fragmented floorboards, each of the humusy brown soils within the walls, namely layers **37b**, **38**, **40** and **45**, produced pieces of 17th-century (second half) clay pipe, and/or sherds of 17th-century German and Low Countries redwares, while layers **37b**, **40** and **45** each produced distinctive cross-fitting sherds of late 17th-century Staffordshire slipware. Layer **40**, the soil directly above the silt on the floorboards, was not banked up and was probably partly exposed during the deposition of the other layers - it is possible that its sherd of Staffordshire slipware was intrusive. Consequently, it is possible that the lowest layers **48** and **40/49** comprise longer-term accumulations during dereliction, while the subsequent banked-up soils against **20** were deposited quickly during an episode of deliberate in-filling, and are therefore part of Phase IV's activity.

Given this information, is it possible to determine the date at which the church was finally demolished and the emptied shell of the chancel taken into use again as a floored and roofed shelter?

Discussion: the correlation of stratigraphical, structural and dating evidence

The ^{14}C date from the charcoal deposit in the chancel suggests that the tree which produced the wood was cut down at some point between AD1520 and the end of the 17th century. Since we do not know which part of the tree the wood derived from, it is impossible to tell exactly at which point during this long potential growth period the tree was felled. However, given the earliest felling date of c. 1520, it may suggest that the charcoal deposit derives from wood which may have been either a late addition to the medieval church (to its floor or roof?) or which post-dates the medieval occupation altogether. It is just within the bounds of possibility that this charcoal deposit derives from the destruction, by fire, of the church building, say in 1531 or 1537. Alternatively, it might have resulted from later clearance work within the ruin. No link can be established automatically as the possible burning of the church, the clearance of its interior, the demolition of the walls to their present level, and the deposition of the charcoal may all have occurred independently and at different times. However, if all these events did take place either simultaneously or within a short interval of time, then the charcoal deposit (together with the equally ambivalent traces of burnt pink mortar on the exposed surface of bedrock here) may indicate that the church suffered damage by fire already during the second quarter of the 16th century. Perhaps the charcoal derives from the burning of a wooden floor in the chancel, a deposit which may have survived subsequent clearance work in the interior, lying as it does within a deep hole in bedrock? If so, this would imply that there were no other deposits between bedrock and the chancel floor (i.e. in order for such a fire to leave its traces on bedrock there cannot have been any layers beneath the floor).

However, the broad date-range provided by the charcoal deposit makes it just as likely that it derived from later activity in the chancel, activity perhaps either associated with a later phase in the gradual demolition of the ruin or completely unrelated to the dismantling of the walls.

Did the clearance of the chancel go hand-in-hand with the demolition of the walls? This is impossible to confirm, although logic might perhaps suggest so. If so, did the chancel shell lie open for some time, or was it soon re-used as the basis of the primitive shack? In the absence of any great accumulation of deposits prior to the construction of the shack's first possible floor level, the latter seems probable. That this lowest floor could already have been in existence long before 1653/4 and the deposition in a layer sealing it of a coin of that date is possible, although the coin merely provides an **earliest possible** date for its own deposition within the layer. The same principle applies to the single sherd from the layer **35**, the disturbed surface of the graveyard and the level at which the chancel was demolished. The presence in it of a possibly early 17th-century sherd may indeed be suggestive of contemporary activity, although in reality the sherd may have entered an already long-exposed layer, perhaps at a point in time long after the church had been dismantled.

Bearing all these uncertainties in mind, the significance of coinciding factors should perhaps be weighed. The presence of a mid 17th-century coin and 3 17th-century sherds in a layer between the two levels of flooring, and the sealing of those floors by dumped late 17th-century deposits, points firmly to the chancel shell's re-use as a primitive shelter by the mid 17th century at the latest. If the clearance of the interior was simultaneous with the demolition of the chancel walls to their present level, and the erection of the shelter followed soon after, then the coin evidence from the interior and the sherd from the exposed surface outside may derive from contemporary or near-contemporary contexts (if they are not intrusive) which combine to suggest that the chancel walls were down to their present level and the interior re-occupied some time during the mid 1600s. However, the process of demolition may have been gradual, the upper graveyard level being the likeliest sole stratigraphical representative of the long period of hiatus between the 1530s and the 1650s if the artefactual evidence can be relied on. In this case the humusy soil **29**, post-dating as it does the graveyard (with its possibly early 17th-century sherd), the outside ditch, and the erection of the shack (as represented by the walling **32**) and its occupation (by 1653/4 at the latest), is likely to be a mid 17th-century accumulation.

However, it is important to remember that the artefactual evidence may well be misleading, reflecting later activity within contexts which existed for some time prior to the deposition within them of these items. Going further out on a limb, it is possible that, if the implications of the coin and the fragmented remains of a first floor beneath it are to be trusted, then the chancel's interior was possibly already in use as a primitive shelter prior to 1653/4. Given the bias in the date-range provided by the charcoal deposit beneath the first floor level, then this first floor may already have been laid following a possible fire in the church and its subsequent clearance, which, as already suggested, may potentially have occurred as early as the 1530s.

The interior of the chancel seems to have been finally back-filled with earth during the next phase, at the end of the 17th century.

These problems of dating the demolition and subsequent re-use of the chancel, and a number of alternative historical scenarios, will be discussed further in Chapter 4.2.

Summary.

The demolition of the chancel walls **20** (and the apse **33**?) must have taken place at the level of **35**, the disturbed upper surface of the former graveyard. It is impossible to estimate how long this level lay exposed, though if historical sources are correct, it may cover a potential period of

130 years. The layer produced a single sherd of possibly early 17th-century date, implying that this surface was exposed well into the 17th century. Consequently, the process of destruction may well have taken place as late as this, although it is again impossible to say whether the building was dismantled in one short episode or piecemeal over a longer period of time. In any case, the demolition of the church left very little evidence in the form of in situ debris, perhaps suggesting that the dismantling of the walls was thorough and systematic.

That the church was down to its present level (at least at this eastern end of the building) by the time the next traces of activity occur would seem to be implied from the character of the remains both inside and outside the demolished walls. However, it is strikingly apparent that whoever undertook this new activity could still see the ruin, fragmentary and depleted though it might have been. Although no physical correlation was possible between the layers and features inside and outside the chancel, a case can be made for their formation as the result of simultaneous activity in and around the ruin.

Outside the ruin to the N. and E., and clearly paying regard to its alignment, a broad shallow right-angled ditch (**41**) may have been dug at some point before, during or after the walls' demolition. A narrow E-W ditch or hollow **42a** was dug parallel with the outside of the length of the demolished N. wall of the chancel (**20**), filled rapidly (?) with a mortary charcoally deposit **36** and was lined deliberately with stone slabs **42**, propped up against the edge of the lowered wall. These features cut the disturbed surface of the former graveyard (**35**). Simultaneously (?), flimsy dry-stone walling **32** was placed on the chancel's N. wall, and some unidentified form of circular (?) stone structure, **34,** of similar construction was erected just to the E. The demolished shell of the chancel was now probably thoroughly emptied of any pre-existing structures and deposits, leaving only a few possibly residual deposits in fissures in bedrock. There was some evidence of fire on the surface of bedrock, including a deposit of charcoal (see Dating), possible hints at a possibly catastrophic episode of burning, which is most likely to have taken place at some point between c. 1520 and the mid 17th century. This clearance appears to have been a deliberate attempt to excavate the interior of the demolished chancel in order to accommodate a secondary structure within it - in effect an insubstantial stone-and-wood shack, whose N. wall was formed by the dry-stone wall **32,** which itself is likely to have supported a primitive wooden roof. The ditch-like hollow **42a** may have been a deliberate attempt at draining this N. wall. There appear to have been two levels of wooden flooring laid within this simple shelter. This may imply prolonged use, with an insubstantial early floor (**57**) having rotted, to be replaced with a more substantial joisted structure (**52**).

Dating evidence for mid 17th-century occupation was found in the layer intervening between these floor levels (see Dating), and with the potsherd from the possible contemporary surface outside (**35**) the evidence suggests that the church was already substantially demolished by the mid 1600s. If the charcoal deposit represents 16th century activity and the first floor level is representative of an earlier phase of occupation pre-dating the deposition above it of a coin of 1653/4, then the possibility exists that the shack was inserted within the demolished chancel at an even earlier point in time.

Alternative historical scenarios in which the activities in and around the ruin may have taken place are discussed in 4.2, below. While these dry-stone structures stood, enough time elapsed to allow the accumulation of a humusy soil, **29**, whose finds content betrays the presence of people in the vicinity. At this stage the shack may have already fallen derelict. At some point during what might be presumed to be a possibly prolonged period of dereliction, or neglect, as represented by **29** outside, the roof of the shack collapsed onto the upper floor, perhaps having burnt, and a sandy silt **48** accumulated, suggesting the shack's abandonment to the elements. The walling **32** may still have been standing, and the shell may have lain open to the skies for some

time. The next deposits within the now roofless and abandoned interior (**40/49 - 37b**) were clearly dumped en masse, and their finds content is suggestive of a single episode of deliberate in-filling which took place in the late 17th century. With the probably contemporary spread of stones **26** to the north of the wall, these strictly belong to the next phase (Phase IV) in which, it is proposed, the derelict shack's dry-stone wall **32** was pushed down to the N. to form **26**, and deposits, characterized particularly by the presence in them of much mortar and stone debris, were dumped all over the site, including the interior of **20**, implying a total reorganization of the area, and the final disappearance of the former chancel. This has its most likely association with the major fortification work undertaken in 1689-90.

2.5 Phase IV (Figs. 26, 27, 28, 29, and 30)

Reorganization and new structural activity. This phase consists of a number of deposits which were dumped over the whole area to heighten and level-up the terrain. The bulk of the material deposited in this possibly brief episode of reorganization comprises spreads of mortar, earthy mortar or mortar and stone. Intervening spreads of less contaminated brown soil also occur. Since it seems reasonable to suggest that these deposits represent a series of layers deliberately dumped over a short interval of time, the stratigraphical problems of correlation are not of vital importance, these layers being part of an essentially unified process. The aforementioned discontinuity to either side of the line of **20** still applies to some extent, although this phase sees the first physical correlation of layers across the line of the chancel wall.

Level 1: To the N. of the area the brown humusy soil **29** of the previous phase was overlain, within the line of the open right-angled ditch **41**, by a localized dump of stone debris **31** in crumbly mortar-ridden soil (possibly continuing S. against the E. wall of **20** as a lower component in the composite context **25**). Occasional worked stones were found within the mainly rubble content. Their origin is uncertain; the stone buildings in the immediate locality seem to have been demolished some time before this dumping took place. The stone must have been brought to the island from outside, or represents material which was used elsewhere on the island, eventually ending up as backfill. Spread over this and a thin spread of brown soil **30** was the brown soil with soft creamy mortar and the strewn stone debris previously mentioned (Phase III), layer **26**. As stated, it seems reasonable to suggest that this layer represents simultaneous destruction and construction activity in the area, the stones strewn here as a result of the demolition of the dry-stone wall **32** which had been set on the demolished walls of **20** to the S. Evidently, at this stage the prime value of all this stone lay in consolidating the ground and raising the height of the locality. Following the collapse or deliberate demolition of **32** to form **26**, the re-used shell of **20** was deliberately filled in, evidently in one go (layers **40/49-37b**). Although no physical connection with the layers to the N. of **20** was observable, these localized deposits clearly derive from the same process.

Level 2: These former deposits were sealed by a mortar deposit, **15=28**, which spread over the S. half of the E-W wall of **20**, and which may correlate with **24** to the N., and be part of this filling-up process which seems to occur across the area. There is some indication in the SE. corner of the site that some sort of more concentrated structural activity took place there, namely the filling of a localized angular pit or depression, **13**, with a sequence of materials, including successive deposits of brown soil and near-pure mortar fragments (**21-8**). With a subsequent dump of rubble and masonry fragments to the N., **22**, this comprises a second sub-phase of infilling within the former line of **41**. It seems that the N-NE.-shelving concentration of deposits in **13**, of which **14** in particular proved to be very concreted, may have formed a more substantial component, clearly acting as a well-consolidated foundation for a structure above it (a wall?). It

was not clear whether or not the concentration of loose mortar lumps **18** formed part of **13**'s fill. If not, as is suggested here, then it is a strong probability that this is the same deposit as the similar material **15=28** within **20** (if so, this has consequences for the correlation and dating of the dumped deposits within **20**, see below). In 1988, the foundation trench of Falkenskjold-smessen to the W. was observed to cut the mortary deposits within the interior of **20** (1988/12 layer **6**): this layer is the equivalent of the present site's layer **15**. If this is the cutting level for FM, then this marks the end of the present phase. Lying directly above the (partly concealed) line of E-W **20**, a localized concentration of human bones was located on removal of **24** in the line of the hollow **27** (Level 1, Figs. 26 and 28). These bones had clearly been deliberately collected and reburied here, and they were probably discovered during digging activity in the locality by the people reorganizing the area at this time, who recognized them for what they were and carefully reinterred them in a hole created by the removal of the wall **32**.

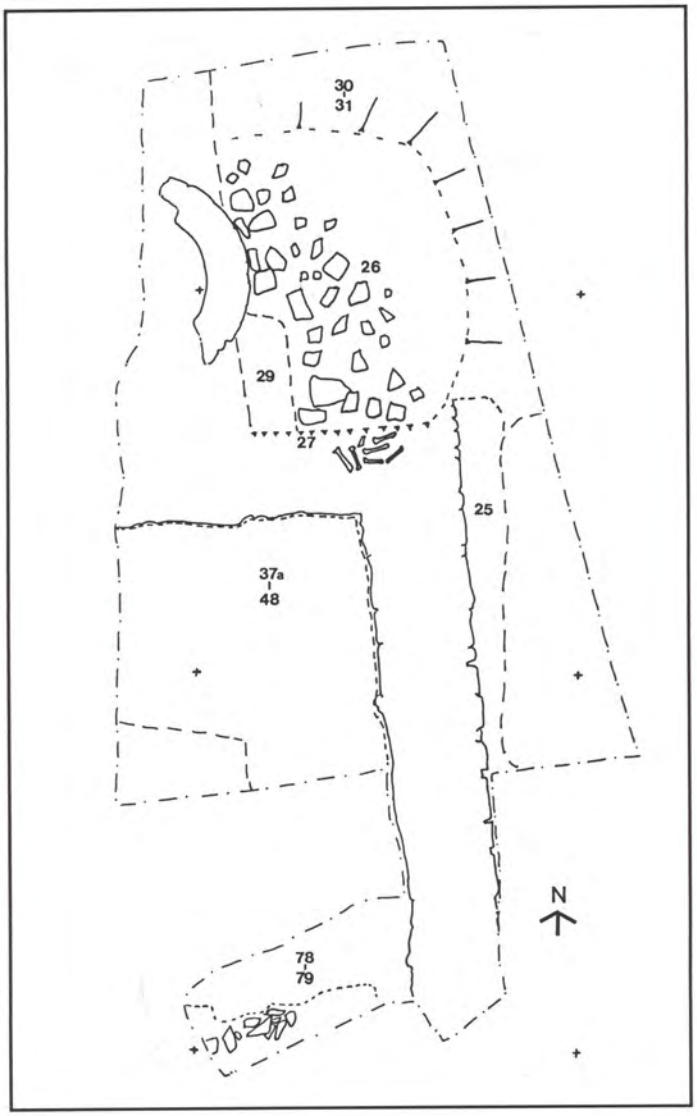

Fig. 26. PHASE IV (Level 1). 1:100.

Fig. 27. *PHASE IV (Level 1). Plate showing the filled-in line of ditch* ***41,*** *stone scatter* ***26****, and dumped soils* ***37a*** *etc. in chancel interior. Looking SW.*

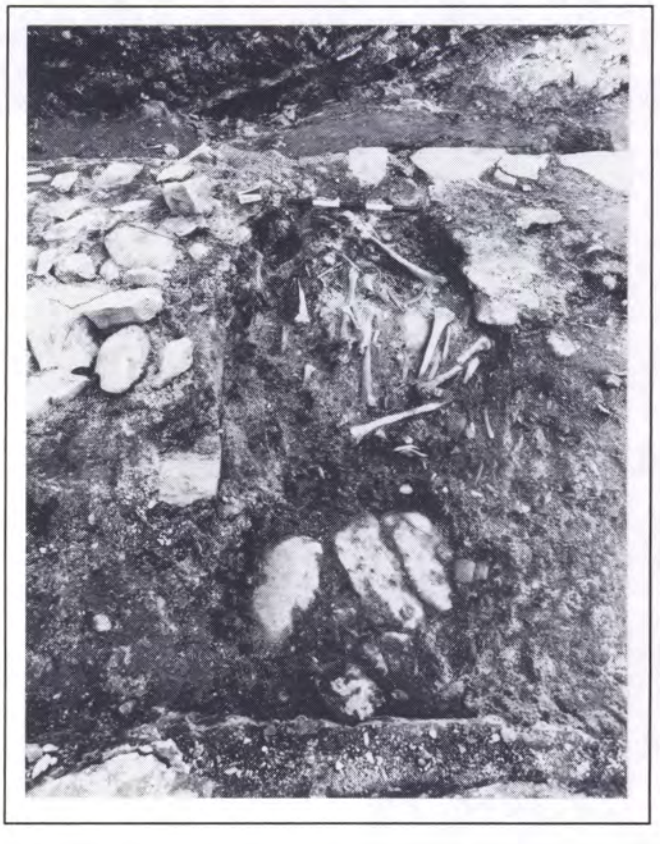

Fig. 28. *PHASE IV (Level 1). Plate showing the concentration of reinterred human bones in the void* ***27****. Note the tumbled scatter of stones* ***26*** *to the left of the hollow, the probable remains of a dry-stone wall which formerly stood in the hollow subsequently filled with these bones. Looking E.*

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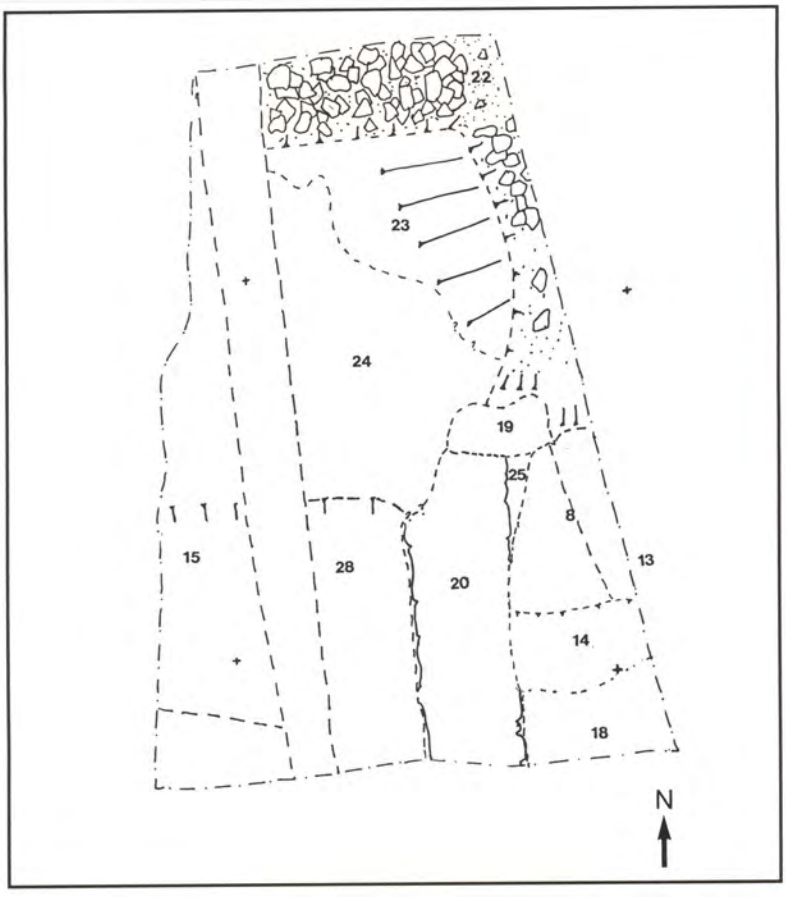

Fig. 29. *PHASE IV (Level 2). 1:100.*

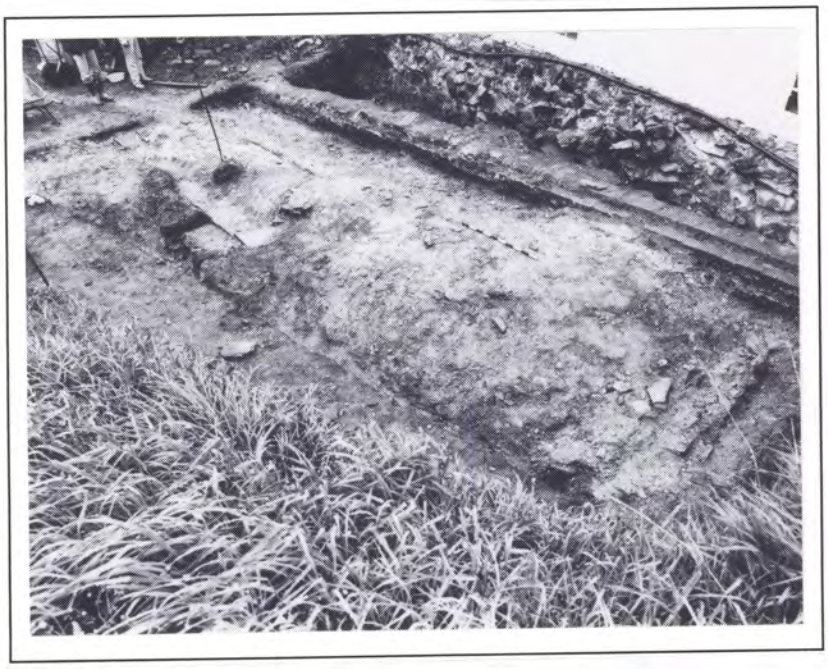

Fig. 30. *PHASE IV (Level 2). Plate showing layers **22**, **24**, **28**, **18**. Looking SW.*

To the N., above the fine mortar spread **24** (contemporary with **28=15**, and cut by **13**?), lay a localized thin patch of brown soil **23**. Above this, and concentrated in the right-angled line of the now in-filled ditch **41**, lay the second dump of stones already mentioned, **22**, which also lay up against mortar **8** in **13**, and sloped NE. Consequently, there is a sequence of at least three episodes of dumping and construction work within the line of the ditch **41**: the lower stones **31**, covered by thin stone and soil spread **30**, followed by the digging and backfilling of the consolidated foundation **13**, followed by the dumping of stones **22**. A localized intrusion or dump of blackish soil, **19**, lay to the E., sealed by the patch of mortar, **10**. Further levelling-up deposits **17**, to the NE. and **16** to the S. may mark the end of this phase of deposition. However, if the foundation for **FM** was cut from the level of **15=28** (not certain), **16** and **17** belong to the next phase.

Dating: Layers **11, 14, 16, 17, 19, 24** and **25** all produced post-medieval potsherds (17th century) and/or clay pipe fragments (second half of the 17th century). There does not appear to be any material which is firmly datable to later activity (the possibly contemporary layers **37b, 38, 40,** and **45**, within the walls **20**, while also producing post-medieval pot and clay pipe of 17th-century date, also possessed residual sherds of medieval pot), so it seems reasonable to suggest that these layers were deposited en masse at some point during the second half of the 17th century. The broken cup of Staffordshire slipware from layers in the shell of **20** is of a late 17th-century type which could conceivably have reached the island already by the 1680s. Consequently, it is possible to place this activity in the late 17th century, and in association with the major reconstruction work on the perimeter wall which took place in 1689-90.

2.6 Phase V (Figs. 31 and 32)

The building of Falkenskjoldsmessen. The building's rubble foundation **55** in brown clayey soil **46** (backfill of foundation trench) cutting through the previous phase's mortary deposits from at least the level of **28=15** (as observed in 1988, and remarked on above) and set partly on the E-W portion of **20**. Up against this was the mixed dark soil **6**, some of which may have been dumped here during the building process, though it seems more reasonable that it either accumulated over some time, or more probably, was dumped en masse in the next phase? Layers **16** and **17** probably belong to this phase.

Dating: Falkenskjoldsmessen's date of construction is known from contemporary documentation: **1710**. Late 17th-century pottery and clay-pipe from **16** and **17.**

2.7 Phase VI

Renewed deposition over the area. A fresh episode of dumping of material for the raising and levelling-up of the area is represented by **6** which comprised various spreads of pebbly soil and brown mixed soil, one of which **9**, contained a concentration of redeposited human bone.

Dating: **6** contained post-medieval potsherds and clay pipe dating from the 17th century through to the 19th century, as well as redeposited human bone and two residual sherds of medieval pot (Grimston). The character of the finds content and its date-range argue strongly for its redeposition en masse during the 19th century as part of fresh constructional activity on the perimeter defences from c. 1825 on.

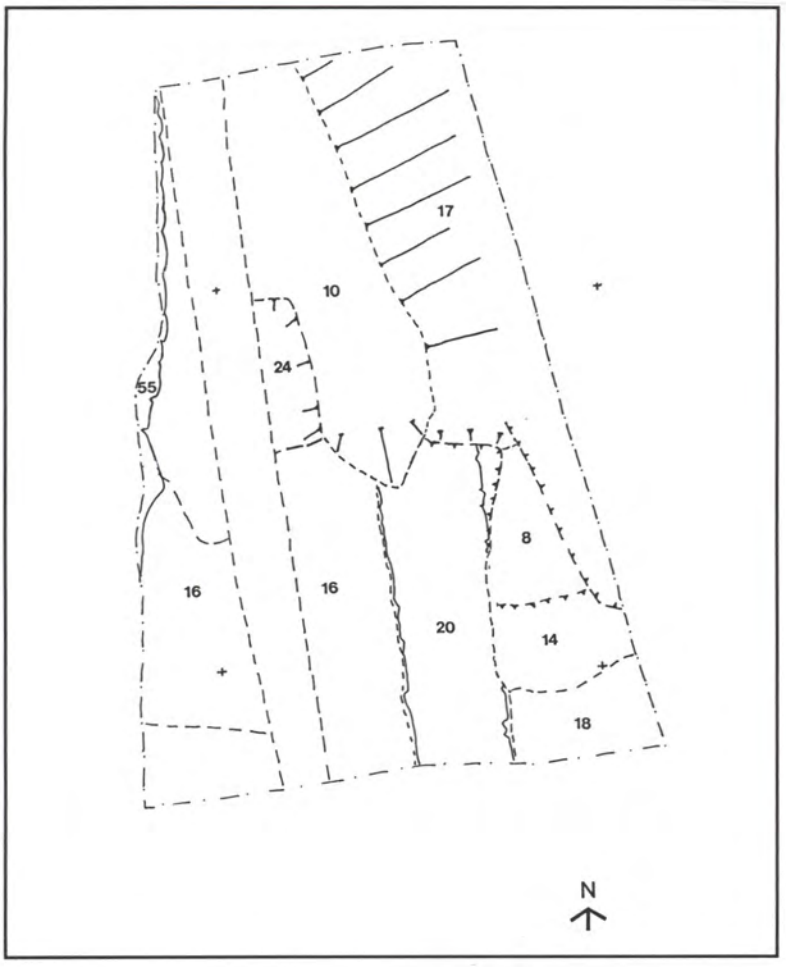

Fig. 31. *PHASE V. 1:100.*

Fig. 32. *PHASE V. Plate showing layers* ***16, 17, 10, 18, 14, 8, 55****. Looking N.*

2.8 Phase VII (Figs. 33 and 34)

This is the final phase of activity in the locality, and includes **5,** another dumped deposit of brown clayey soil. **7**, a brick-built duct (which incorporated re-used medieval bricks) may have been sealed by this layer, or possibly cut it, the relationship being somewhat unclear. This deposit was cut by a number of (unnumbered) cable trenches, and a trapezoidal cut **4** containing a bed of sand, **3**, which held the closely-set trapezoidal platform of large stones, **2**. A deep pit **12** to the SW. against Falkenskjoldsmessen was revealed under the turfs.

Dating: Layers **1** and **5** contained potsherds and clay pipe dating from the 17th century to the 19th century, as well as 20th-century objects such as a bakelite fuse and bottle tops. The duct **7**, while incorporating medieval brick, also included modern brick and concrete. **12** contained a broken modern spade. It is clear that this material is predominantly redeposited, probably dumped here during the area's frequent disturbance in the present century. The brick duct is clearly part of the German army's water-collecting system built in 1940. The stone patio-like platform may post-date the war. The pit **12** is Lunde's trial hole from 1970.

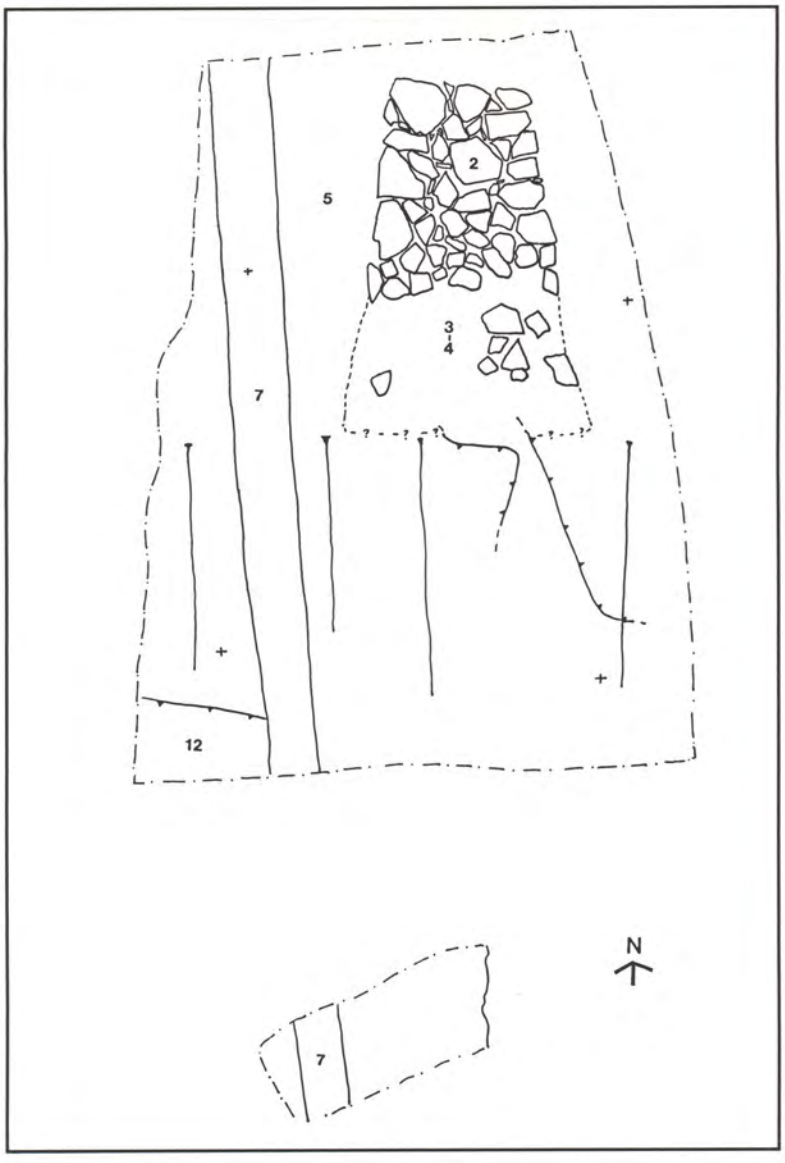

Fig. 33. PHASE VII. 1:100.

*Fig. 34. PHASE VII. Plate showing the stone-paved area **2**, and layer **5**. Note the 1988 trial trench against the exposed foundation of Falkenskjoldsmessen.*

3. THE MEDIEVAL STONE STRUCTURES: DESCRIPTIVE ANALYSIS

Excavation revealed the partially preserved lower portions of two adjoining stone-built structures (Figs. 35 and 36): the remains of a square-ended building, the eastern end (i.e. the presbytery) of the chancel of the medieval church, and, on its northern flank, a small apsidal structure, part of a probable side-building, in all likelihood a chapel. The two structures differed from each other in specific constructional details; in particular in their respective orientations, methods of foundation and in the type of stone and masonry techniques employed. Stratigraphical evidence indicates that the chancel was built first, the apse being added at a later instance.

3.1 The Chancel

Description

This is represented by the remains of three lengths of walling (**20**) adjoining each other at right-angles, of which the northern and eastern lengths were the best preserved, the southern wall being represented by only a few mortared stones set on bedrock (Figs. 35 and 37). These low stumps of walling together compose part of a formerly more substantial square or rectangular structure whose surviving dimensions measure c. 9m (N-S) x 4.3m (E-W) externally and 6.4m x 3m internally. The N. and E. walls were preserved to maximum heights of 55cm and 40cm respectively. The N. wall's surviving maximum upper surface width was 1.6m, while that of the E. wall was 1.3m. The N. wall's maximum basal width was 2m, while that of the E. wall was 1.7m. There seems to be a consistent difference in width between these two walls of roughly 30cm.

Both walls comprised a concreted mortar-and-slate core with an outer facing of superimposed continuous courses of quarried stone, predominantly a fine-grained slightly greenish-grey stone of as yet undetermined origin (possibly locally derived greenstone). The N. wall contained one stone with a different, flaking character. The surviving lower c. 40cm of both standing walls' internal faces do not appear to have been faced with stone courses, the ragged core being visible all the way down to bedrock. Some evidence for a probable first course of internal facing placed at a higher level does exist in the form of at least one substantial quarried block visible along the upper internal edge of the E. wall at the level of its now-exposed surface. Other smaller partially visible blocks and isolated patches of mortar probably also derive from this formerly lowest level of internal facing (Fig. 38).

Outside the chancel, the foundation level was partially exposed along the line of the E. wall, while the N. wall's foundation level remained largely unexcavated. The E. wall (Figs. 39a, 40 and 41) appears to have possessed at least two foundation courses of comparatively small stone slabs mortared both to each other and to the surface of bedrock. Above these were two complete courses of larger sub-rectangular stones, with the partial remains of a third course of thinner slabs, all mortar-bound. These upper courses of facing stones were laid on an alignment which deviated partially from that of the two foundation courses, the latter emerging obliquely from a point half-way along the line of the external facing to form an incomplete plinth-like projection. This "plinth" seems to have been confined to the N. half of the E. wall's external length. No trace of a similar projecting arrangement was located in connection with the N. wall (while not fully excavated, it seems probable that the N. wall's lowest facing course did not rest on a foundation, but was rather itself mortared directly onto bedrock).

Fig. 35. *NIDARHOLM ABBEY CHURCH. Chancel and apse, as excavated. 1:50.*

Fig. 36. *NIDARHOLM ABBEY CHURCH. Plate showing the chancel and apse. General view. Looking S.*

Above the foundation, the E. wall's two complete courses of quarried rubble facing formed a regular and consistently level arrangement. The lowest of these courses consisted of roughly hewn subrectangular blocks and slabs of about 10cm in thickness. As with most of the chancel walling, there were few if any pinning stones in evidence. The course above this comprised a similarly regular arrangement of larger hewn blocks (c. 20cm thick). The upper surfaces of some of these could be seen partially in the exposed core of the wall; some were set with their greater lengths parallel to the line of the wall, while a few others were bound into the core with their lengths at right-angles to the line of the wall. A few pinning stones set on their edges occasionally intervened in larger gaps between the blocks of this course. A few thinner slabs (c.4cm thick) lay above the second course, possibly forming the remains of a third course. If this is any indication, the E. wall may conceivably have held a series of variably thick courses (and even perhaps placed in a systematic, though irregular, sequence of alternately thick and thin courses?).

The N. wall's external facing was somewhat more irregular than its E. counterpart in terms of the composition and horizontal arrangement of the courses (Fig. 39b). It appears that the builders had to contend with a more irregular surface of bedrock at this point: the wall seems to dip slightly downwards as it proceeds westwards, something which may denote a localized declivity in bedrock (note the N-S running clefts in bedrock exposed within the chancel, Fig. 36). In their quite exaggeratedly dipping horizontal alignment, the two lowest courses in particular reflect this irregularity. However, it appears that some attempt was made to correct this by using increasingly larger blocks of stone in the first course as it proceeded westwards, and by the insertion, from about halfway along, of a possibly deliberately incomplete third course of blocks which, by virtue of their gradually increasing sizes, partially compensated for the dip of the two lowest courses. That this irregularity manifests itself in the facing courses perhaps adds weight to the suggestion that the N. wall had no foundation course; a foundation course properly tailored to the irregularities in the terrain would arguably have forestalled the need to make the aforementioned adjustments in the facing.

Fig. 37. *NIDARHOLM ABBEY CHURCH. Plate showing the fragmentary remains of the chancel's S. wall, and its junction with the E. wall. Looking E.*

Fig. 38. *NIDARHOLM ABBEY CHURCH. Plate showing the emptied interior of the chancel. Note the ragged exposed core on the inner faces of the walls, the patches of secondary whitewash, and the protruding slab (remnant facing?) on the E. wall's surface. Looking NE.*

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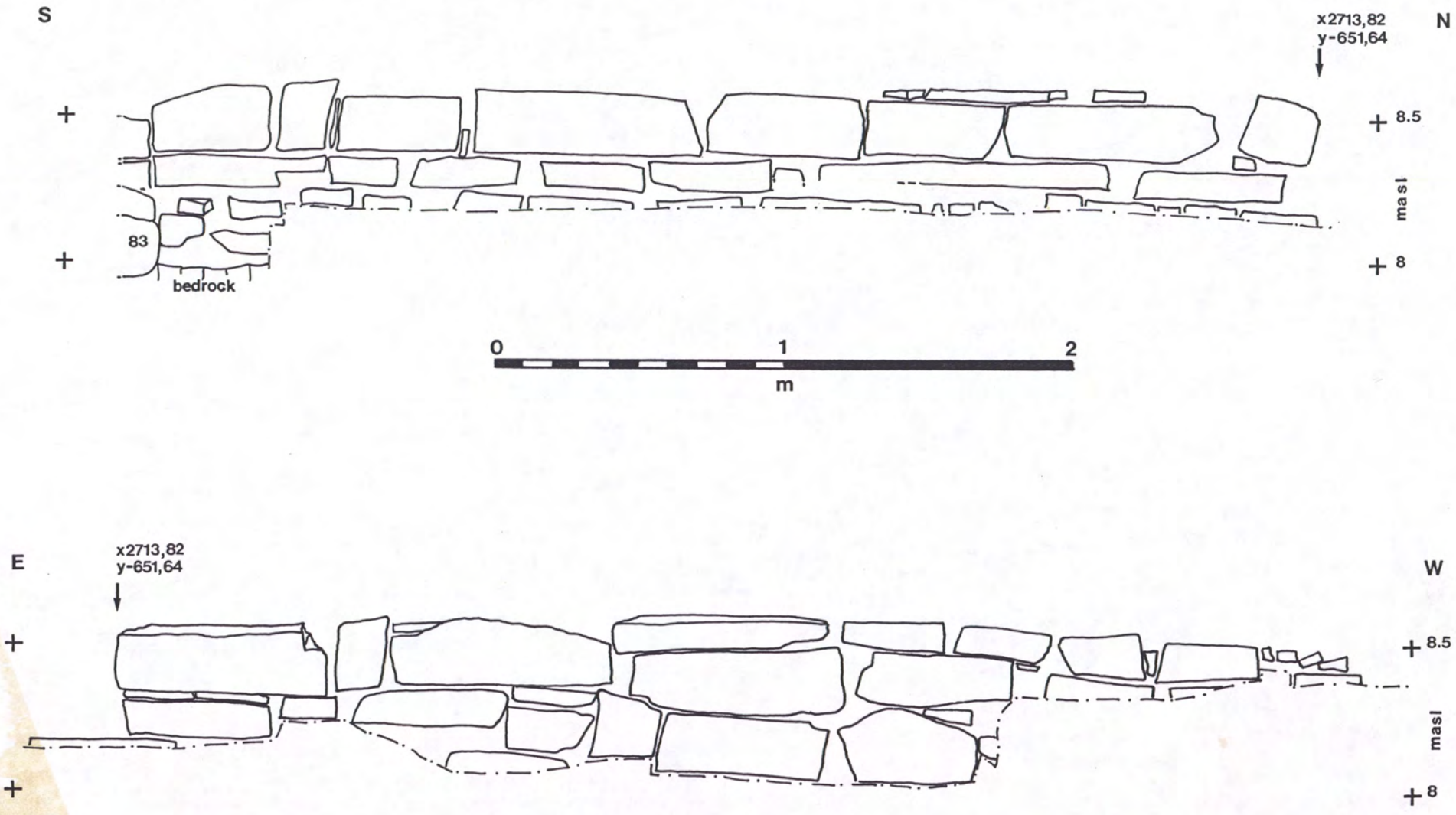

Fig. 39. *a. NIDARHOLM ABBEY CHURCH. The chancel's E. wall in elevation. 1:20.*

b. NIDARHOLM ABBEY CHURCH. The chancel's N. wall in elevation. 1:20.

Fig. 40. *NIDARHOLM ABBEY CHURCH. Plate showing the chancel's E. wall. Looking N.W.*

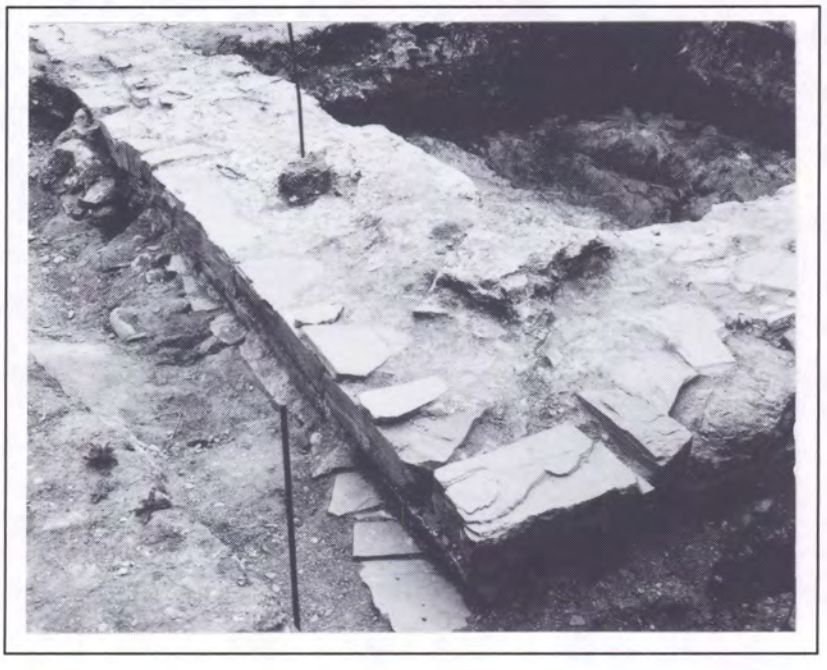

Fig. 41. *NIDARHOLM ABBEY CHURCH. Plate showing the chancel's E. wall and the protruding "plinth". Note also the clump of mortared boulders in the top left hand corner, the remains of possible walling (**83**). Looking SW.*

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The first course incorporates variously sized stones in its line, ranging from thin slabs for pinning and/or levelling-up to larger rectangular blocks, with a maximum thickness of c.20cm (compare this with the more consistent size of slabs used in the E. wall's first course, suggesting again a deliberate attempt to compensate for a localized irregularity). The second course employs larger blocks, comparing favourably in thickness with those of the E. wall's second course (c. 20cm).

Of those stones in the second course whose upper surfaces were visible, most were set with their lengths parallel with the line of the wall, only one visibly being set lengthwise into the core. However, most of the stones visible in the third course seem to have been set lengthwise into the core. Two of the second course's blocks which lie parallel to the wall-line have slipped slightly out of their original positions. This may have occurred during, or at some point following the wall's demolition.

The S. wall was almost entirely removed at some point in antiquity. All that remained was a concentration of loosely consolidated small rubble stones mortared to each other and to bedrock, which also bore patches of mortar (burnt pink) on its surface. This irregular mass forms all that remains of the former core of the S. wall of the chancel.

The interior of the chancel was completely cleared out down to the level of bedrock at some time following the abandonment of the church, and the demolished shell was modified and taken into use as a make-shift shelter, complete with wooden floors (Phase III). The rough inner face of the N. wall also seems to have been whitewashed in conjunction with this phase of re-use. As a result of this disturbance, no remains of flooring, an altar foundation or former graves survived.

Discussion

The character of the chancel's surviving walling is consistent with the coursed-rubble building technique prevalent in Norwegian Romanesque stone buildings of the 12th and early 13th centuries (Lidén, 1976, 11, 37-40). Typical are the successive continuous courses of roughly hewn undressed stone slabs and blocks in the outer facing. These stones were bound with mortar and laid with their greater lengths either parallel with the line of the wall or occasionally inserted at right-angles into the dense concreted mass of the slate-and-mortar core, thereby uniting and consolidating the wall's internal and external elements. (These features are typical of "kistemur/-bruddsteinsmur" construction). The width of walling is well within the contemporary norm for church walls, and the fact that the N. wall is some 30cm wider than its easterly fellow is possibly indicative of the former's role (with its S. companion) as the main load-bearer of a vaulted roof. The square-ended form of the chancel is again a typical long-lived feature of Romanesque church architecture in Norway generally and within the local region in particular. Its internal width is in keeping with a chancel of the size of that of the nearby parish church at Værnes, for example (see Chap. 4 for building-historical discussion).

As regards the deviation in alignment between the E. wall's foundation courses and the external facing: it is perhaps worth querying whether this was pre-planned or the result of subsequent readjustment as work proceeded. Certainly, bedrock appears to drop steeply to the E.; perhaps the provision of this partial plinth was necessary to provide extra stability at a point where the E. wall of the chancel perched on the crest of a slope? That the terrain played a part in determining the character of the N. wall has already been pointed out.

Due to the drastic post-medieval modifications within the chancel, the precise level at which the medieval floor(s) lay is difficult to determine. However, the floor is perhaps most likely to have lain flush with the lowest course of inner facing stones, evidence for which (cited above) lies at some 40cm above the base of the walls (a level which is also broadly consistent with the lowest course of internal facing in the neighbouring apse, the floor of which must have been at approxi

mately the same level as that of the chancel). Patchy remains of burnt mortar occur on the surface of bedrock in the chancel interior. If the chancel had a stone floor, it is likely that it rested on a stone-and-mortar foundation which was founded directly on bedrock (as in the neighbouring chapter house). This residue may be all that survives following thorough clearance of the interior in antiquity, though if so the mortar must have suffered burning at some point after the removal of the stone floor. Alternatively, a deposit of charcoal in a cleft in bedrock here may hint that the chancel was floored with wood, although in that case this must have been a late addition to the church judging by the date range produced by the sample (Phase III; Dating). It seems more likely that this charcoal derives from post-destruction activity within a cleared-out chancel.

3.2 The Apse

Description

The remains of a small half-circular stone structure lay close to the N. wall of the chancel (Figs. 35 and 36). It was preserved to a height of 50cm above its foundation, which was partly exposed in a trial trench as well as in the structure's interior. The curved wall maintained a consistent width of 53cm. The maximum diameter of the whole structure (N-S) was c. 2.6m, while the internal diameter (N-S) was c. 1.5m.

Most of the wall's two lowest courses of external stone facing were preserved, while only one stone now remains in the third course (a second example was loose and removed during excavation) (Figs. 42 and 43). The stonework consisted principally of soapstone (kleberstein), although there occurred one brownish stone of uncertain type in the lowest course's southern part, and one slate in the second course's northern part. These regularly cut and dressed ashlar blocks and slabs were laid in even and regular continuous horizontal courses, the stonework set tightly together with intervening gaps of only 0.2-1.8cm. These gaps were filled with earth, though it is clear that mortar was used to bind these stones both to themselves and to the inner core of mortar and stone. The blocks averaged c.20cm in thickness in the lowest course, 8cm in the second, while the third course's single stone measured 18cm in thickness. The courses were therefore arranged in a sequence of alternating thicknesses. This alternation of thick and thin courses has been observed elsewhere (e.g. the chancel of Nærøy church, Nord-Trøndelag); the technique seems to have been used as a means of consolidating the wall, the thinner slabs being bound firmly into the core, while the larger stones stood on edge and flush with the line of the wall (Lidén, 1976, 42-43).

As stated, the facing stones were fitted snugly together, each being cut to form a component in a regularly curved structural arrangement. In this the masonry technique appears to be of good quality. However, the character of tooling on these stones' external faces was variable (Fig. 44), being roughly dressed with chisel-marks cut in divergent directions. The surface of one stone in the first course bore both roughly and finely dressed portions (a practice piece?). The stones in the second and third courses were perhaps slightly better finished. One of the stones in the lowest course had a partly mortar-filled 8cm diam. hole bored into its face, as well as a slot some 8cm wide in its base (a re-used stone?). These facing stones appear for the most part to have been placed with their greatest lengths in conformity with the line of the wall.

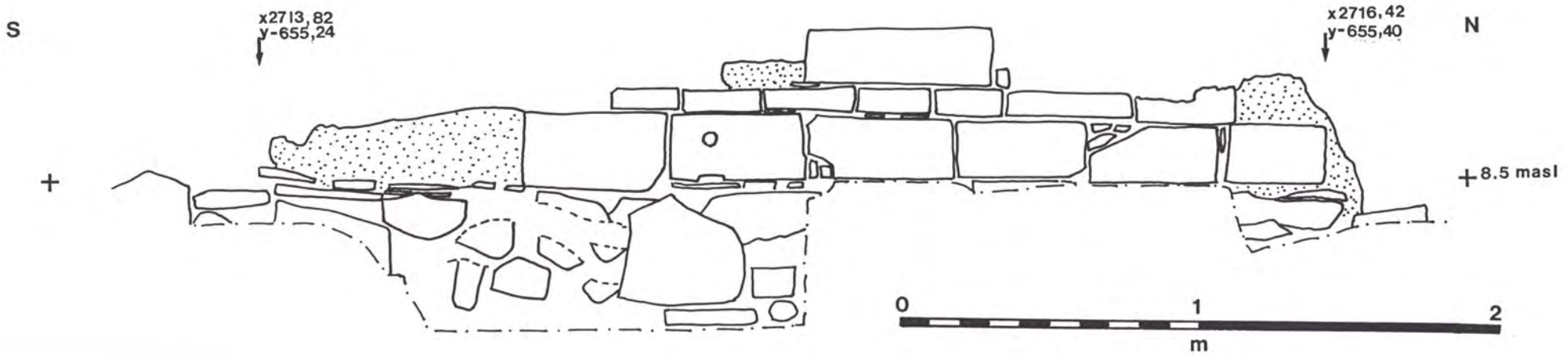


Fig. 42. *NIDARHOLM ABBEY CHURCH. The apse in elevation (in stretched perspective). Looking W. 1:20.*

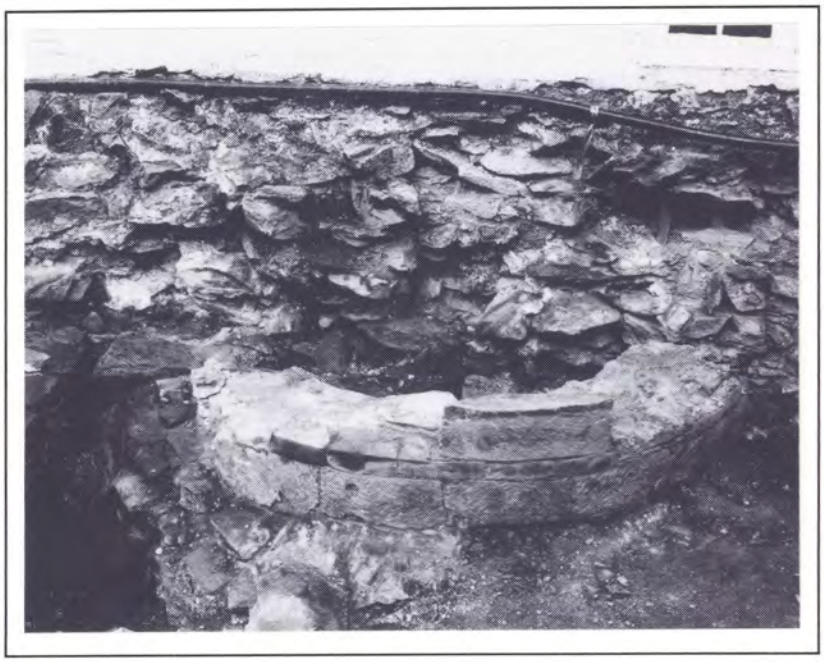
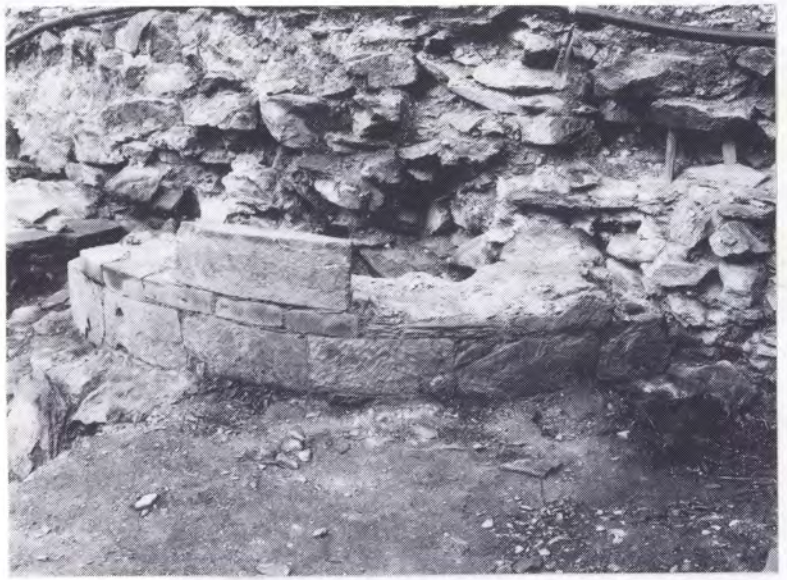


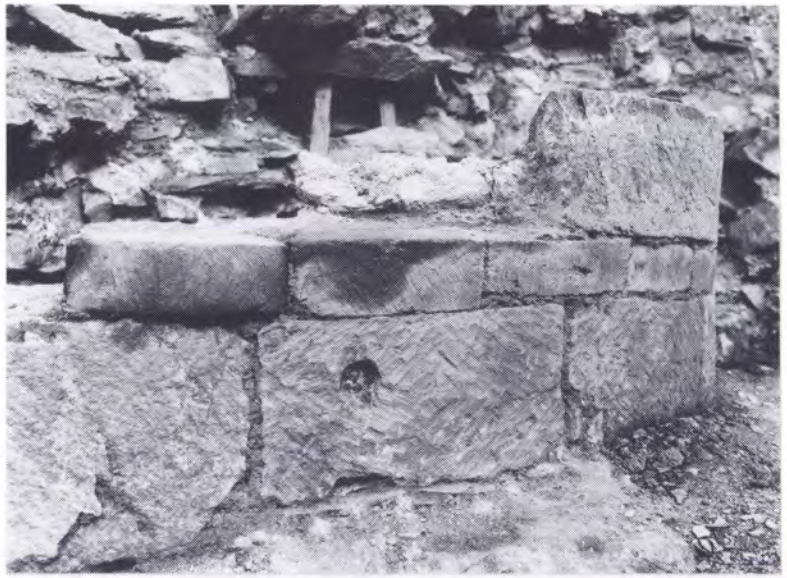
Fig. 43. NIDARHOLM ABBEY CHURCH. Plate showing the apse as excavated. Looking W.

The wall's internal face was also very regular, with a vertical surface (Fig. 45). This face bore a layer of mortar rendering, roughly applied with a trowel or similar tool. It was possible to see behind this plastered surface at one point; the coursed stones forming the internal face here were apparently not of soapstone. To the N. and S. it was possible to see the impressions of removed internal facing stones in the surviving mortar. What remained of the internal face was preserved to a height of 30cm. The inner face's plaster rendering was observed to partly overlie a number of mortared stones and slabs which formed the apse's internal foundation at this point. The plastered interior bore no physical traces of a floor above this foundation.

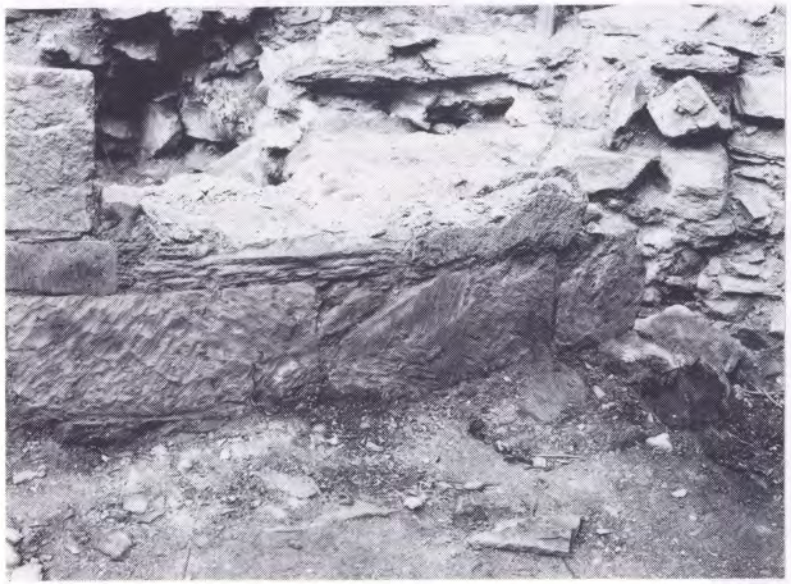
Within the line of the wall at its S. end, where the overlying courses had been removed in antiquity, the topmost stones in the external foundation were exposed. These comprised small slate slabs (c. 2-3cm thick) which formed a flattish surface of pinning stones, or a primitive plinth, upon which the outer stonework rested. These protruded slightly from the base of the first course. The main body of the lower part of the foundation was exposed in a trial trench against the S. half of the apse (although bedrock was not reached during excavation). Here the foundation comprised irregular-sized rubble sloping out from the wall for a distance of some 40cm, the width of the narrow foundation trench in which these lay. This trench cut the lowest excavated graveyard level (Fig. 18). It was back-filled with a layer of gravelly sand against the sloping rubble foundation. There was no mortar between the foundation stones here.



a. Looking SW.



b. N. half, looking NW.



c. N. half, looking W.

d. Looking SW.

Fig. 44. NIDARHOLM ABBEY CHURCH. Plates showing the apse in detail.

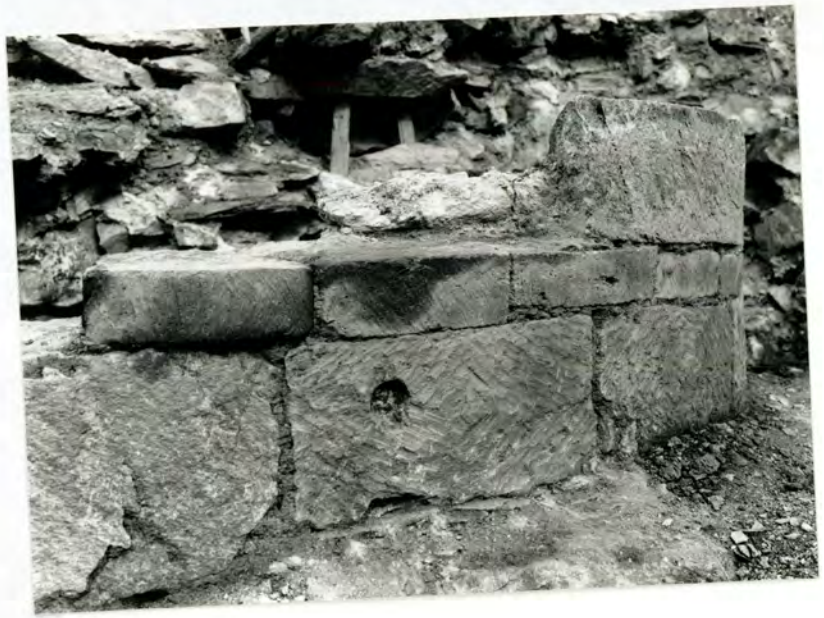


Fig. 45. *NIDARHOLM ABBEY CHURCH. Plate showing the interior and foundation of the apse. Looking N.*

In the S. part of the apse both the inner and outer facing stones were removed in antiquity leaving only part of the mortar core. It was possible to reconstruct the line of the wall here on the basis of remnant mortar patches and the position of the stonework in the upper surface of the foundation. It was also possible to confirm that the outer facing of the apse did not actually physically touch or join with the courses in the chancel's N. wall. At its maximum southernmost extension, the apse wall came no closer than 40cm to the chancel wall. Also at this point a large foundation stone belonging to the apse was observed to have been set lengthwise across the intervening gap between the apse and chancel walls. This was not bound into the choir wall, but simply butted up against it. The chancel wall's lowest courses were observed to continue unbroken further W. of this point. Consequently it is possible to say that the apse's foundation was built up against the chancel's wall, which must have been standing to at least its present level when this was undertaken (this is further supported by the fact that the apse's foundation trench cuts the lowest graveyard level which was deposited after the construction of the chancel's N. wall). To the W. of the aforementioned large foundation stone, the apse's foundation continued in the form of smaller rubbly stones, filled in against the chancel wall, within the back-filled sand of the apse's foundation trench.

The foundation was not exposed to the N. of the apse. However, the line of the c.40cm-wide foundation trench was traced in the surface of the graveyard, and it was observed to follow the line of the apse's curve to its northernmost extension at which point it turned abruptly northwards and away from the apse (Fig. 35). This provides evidence which confirms that this structure was

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built as a half-circular projection (rather than a formerly circular structure), with a further (unknown) length of associated wall jutting out from the northernmost point on its curve. A short length of N-S walling between the apse and the chancel must have joined these two buildings (above the large stone noted in the apse's foundation at this point?).

A further important point to note is that the apse and the chancel deviate from each other slightly in alignment, the N. wall of the chancel clearly lying at an oblique angle to the axial orientation of the apse (Fig. 35).

Discussion

That this apsidal structure represents a second phase of construction associated with the church building is implied by the stratigraphical evidence encountered in the graveyard levels between the chancel and apse (above, and Phase II), and the tell-tale deviation between the two structures' alignments. Its foundation was built up against the standing wall of the chancel and does not appear to have been firmly bound in to it. It is solely on this basis that the two structures can be relatively dated. The observable differences in constructional techniques employed in the chancel and apse cannot be used to date the structures closely, either independently or in relation to each other, since they are techniques which were employed coextensively throughout the Romanesque period. The differing forms of foundation can be explained on technical grounds, whereby the apse, not being founded directly on bedrock, required a sturdier, entrenched and battered foundation. Furthermore, the use of closely-fitting ashlar masonry is more suited than rubble to attaining an accomplished apsidal form.

As already postulated, this apse must represent the E. end of a projecting structure, perhaps a side-chapel, built up against the standing wall of the chancel, and possibly also attached to the nave (see conjectural reconstructions, Figs. 49 and 50). One interesting suggestion is that the line of the N. wall of the present-day Falkenskjoldsmessen may follow that of this former side-building's N. wall, the new building using the older wall as a foundation (Ø. Lunde, pers. comm.). This would make for quite a wide side-chapel.

The apsidal form is a common feature of Romanesque architecture in Norway as elsewhere, although its incorporation within contemporary church buildings in the local region of Trøndelag is comparatively rare in comparison to its more frequent occurrence further south in Norway. The combination of an apsidal side-chapel with a square-ended chancel can be paralleled elsewhere (see next chapter), though it is a relatively infrequent combination.

As regards the particular character of the ashlar masonry employed in Nidarholm's apse: the local contemporary school of masons, centred on Nidaros cathedral's workshops, is known to have produced characteristically small blocks of soapstone ashlar. The stonework evidenced here seems to be in keeping with the preferred regional masonry technique which compares favourably with 12th-century English workmanship (Lidén, 1976, 41-42).

4. DISCUSSION: THE ARCHAEOLOGICAL REMAINS IN THEIR HISTORICAL CONTEXT.

4.1 The Medieval Abbey Church

We were indeed fortunate, given the degree of post-medieval activity in the locality, to find so much preserved of the eastern end of the monastery's church. The surviving remains were sufficient to give us important, though, regrettably, as yet inconclusive insight into the form that the church building might have taken and the date of its construction. All four wings of the monastic enclosure are now represented physically (Fig. 8), the church lying across the northern wing, the chapter house in the eastern wing, and the various other monastic buildings placed in the remaining portions of the complex ranged around the cloister garth. The graveyard lies to the N. of the church. The complex appears to have been sited on the greatest expanse of flatter terrain on the island, in the lee of a rocky knoll to the west, and the church itself would have further contributed to the shelter of the community from northerly winds and weather.

4.1.1 Early stone-church architecture in Norway

According to the sagas, the earliest Norwegian stone churches date from the reign of Harald Hardråde (1047-1066), who built St. Mary's in Trondheim/Nidaros and converted his predecessor's stone hall into the church of St. Gregory. Under his successor Olav the Gentle, work was begun on the stone cathedrals in Nidaros and Bergen. Of all these, the only certainly attributable remains yet discovered are those of Olav the Gentle's Christ Church (begun c. 1070) which lies under the present Nidaros Cathedral (Fig. 46). Elsewhere, in SE. Norway, a characteristic group of early stone churches is centred on Oslo - St. Clement's, St. Mary's and St. Edmund's, Hovedøya - dated to the period 1080-1120 (Eide, 1986, 73-74).

Nidaros and the surrounding parishes in Trøndelag seem to have been particularly active in the earliest developments in Norway's tradition of Romanesque stone-church architecture. Værnes church, a few miles outside Trondheim, is typical of the early-adopted plan for larger parish churches in the region, with its aisless and transeptless nave, narrower rectangular square-ended chancel, and square western tower (Fig. 47, 2). This simple double-celled arrangement clearly draws on that of Olav the Gentle's Christ Church, and is a form which has clear associations with English church architecture, an association which was also inspirational within the sphere of local carved architectural details.

By the first decade of the 12th century, when Sigurd Ullstreng allegedly founded (or refounded) the monastery of Nidarholm, stone churches were as yet still fairly rare in Norway, confined principally to the towns and their environs. As the 12th century progressed, the district of Trøndelag, with other regions in Norway, experienced a marked increase in numbers of stone churches, although the vast majority were probably built during the second half of the century. The century's early years saw the establishment of Norway's two other earliest monasteries at Selje (c. 1100) and Munkeliv (c. 1110), both (as at Nidarholm) Benedictine foundations. With a small number of other foundations these represent the first phase of monasticism in Norway, the second phase beginning towards the middle of the 12th century.

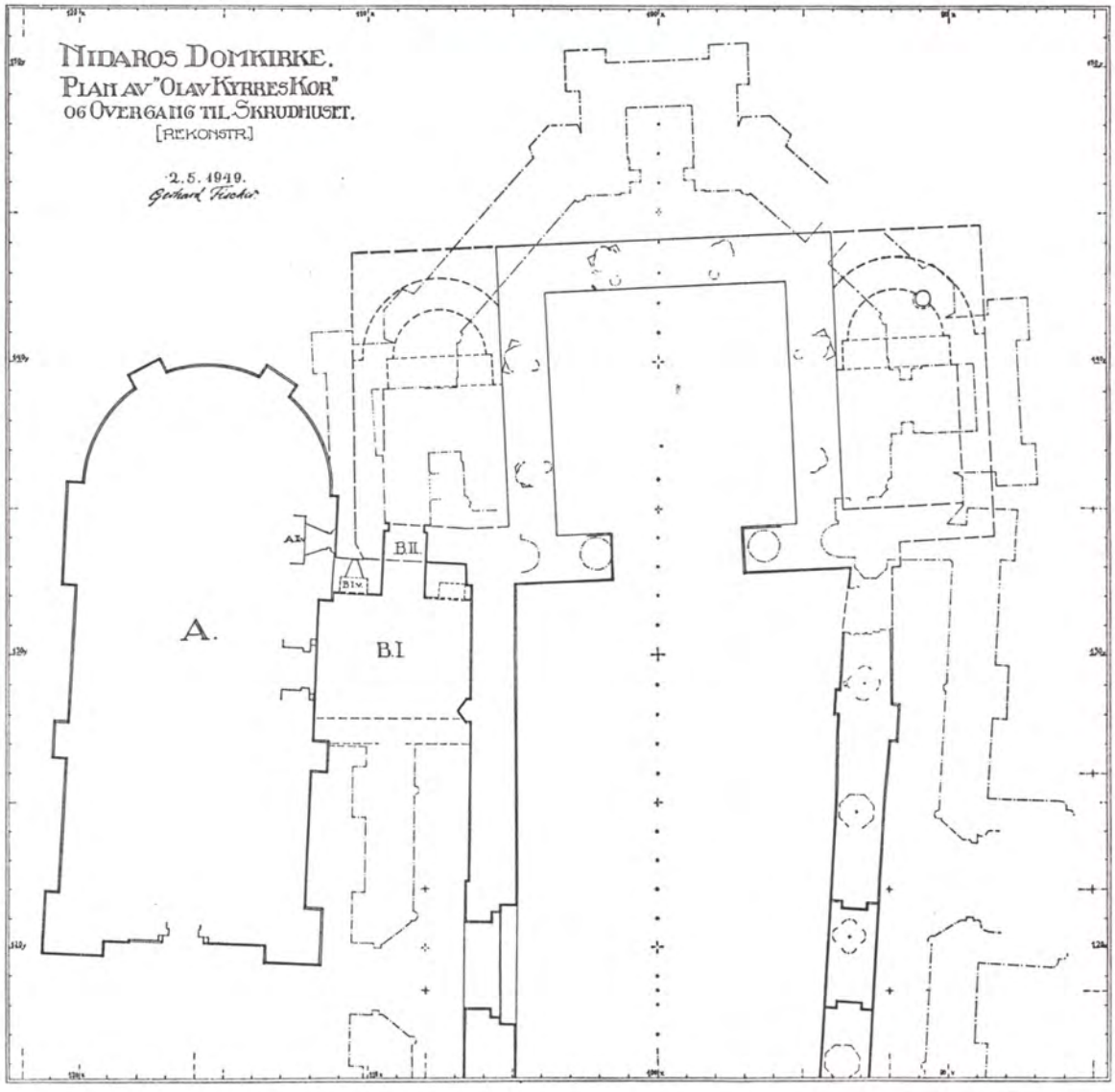
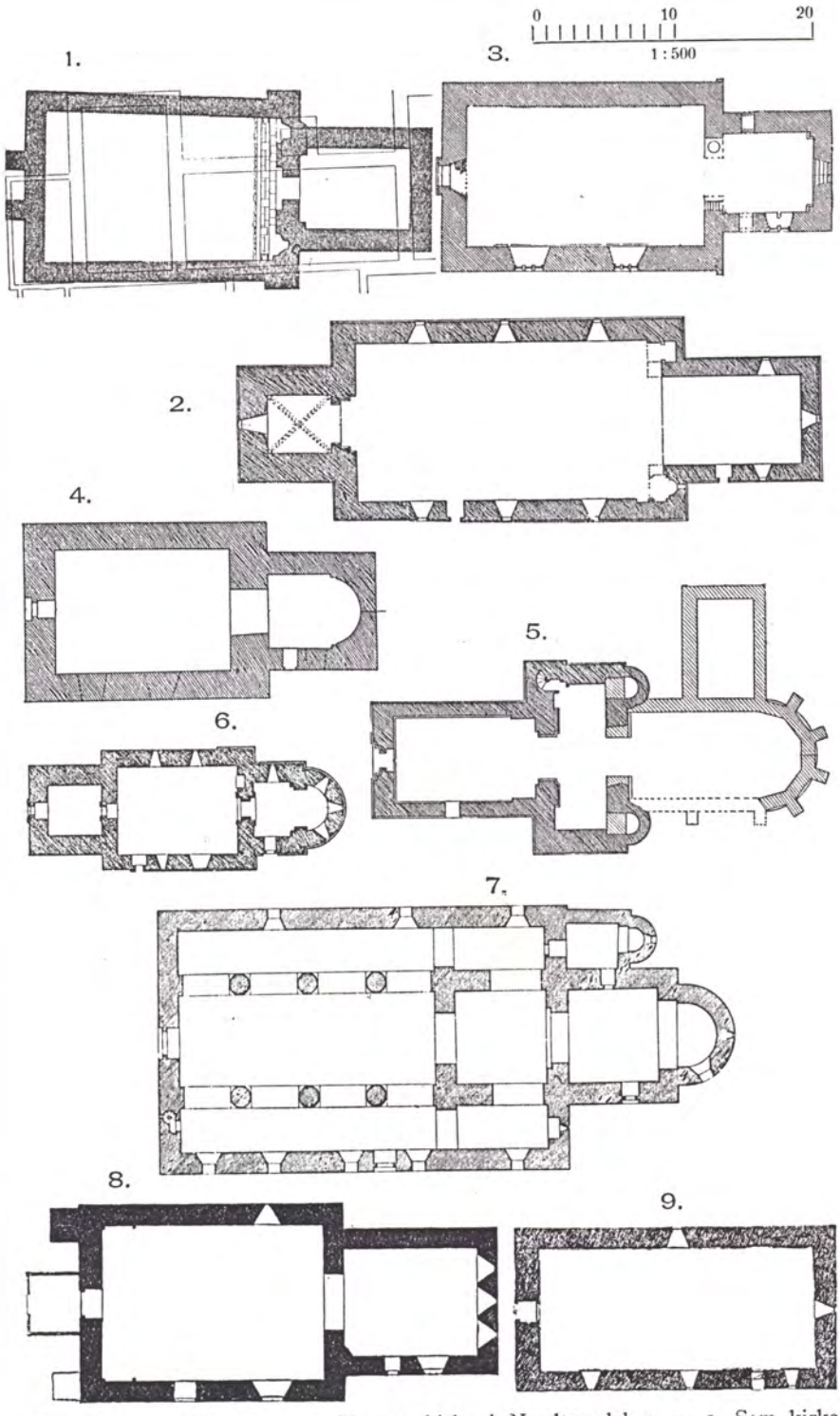


Fig. 46. *Christ Church, Nidaros. Reconstruction by G. Fischer showing the ground plan of Olav the Gentle's cathedral church. The actual form taken by the side-buildings is uncertain (Fischer, 1965, 29).*

A wide variety of ground plans were utilized in Norwegian Romanesque stone churches. However, very generally speaking, and with due regard to individual and regional norms and variations, it can be said that the principal elements seem to have been in place from early in the 12th century: the body of the chancel could be square (rectangular chancels appear to be a later development), with a square end or an apsidal end; the nave might be aisless, a characteristic of Trøndelag churches, or equipped with two aisles, the regular basilican plan particularly associated with churches in south-east Norway. Transepts, and the fully developed Romanesque plan, appear from about the second quarter of the 12th century, and it is from about the same time that projecting side-chapels (as distinct from small altar niches) begin to gain popularity (though they possibly make their first known appearance as later additions to Olav the Gentle's Christ Church



1. Olavskirken, Nidaros. — 2. Værnes kirke i Nordtrøndelag. — 3. Sem kirke i Vestfold. — 4. Efterløt kirke i Sandsvær. — 5. Mikaelskirken, Tønsberg. — 6. Hove kirke i Sogn. — 7. Gamle Akers kirke. — 8. Vangens kirke, Aurland i Sogn. — 9. Eidfjord kirke i Hardanger.

Fig. 47. Some Norwegian Romanesque churches (from Bugge, 1933, 202).

at about the turn of the century). Their construction with apsidal ends seems also to begin during the second quarter of the century (though again, there is some very tentative evidence that the side chapels in Christ Church may have possessed apsidal ends by the beginning of the 12th century; Fig. 46). With regard to plans adopted in the first Benedictine monasteries: Selje monastery's first small stone church comprised a basilican plan, though it was somewhat unusual in that its nave and two aisles shared the same roof, there being no clerestorey. However, it is not certain that the Benedictines were responsible for this church, its groundplan perhaps being more consistent with a function as a bishop's church (A.T.Hommedal, pers. comm). The larger church at Munkeliv possessed a somewhat unusual plan, with a short apsidal chancel spanning the same width as a probably aisless nave. The chancel is reminiscent of that found in the earliest Lund Cathedral.

The Romanesque parish churches in the Trøndelag district form a group with closely related ground plans. These have their local prototype in the earliest known surviving Norwegian stone-church plan, namely the aisless nave and square-ended rectangular chancel of the late 11th-century Christ Church in Nidaros. In addition, these churches possess an interrelated group of characteristic carved Romanesque stonework and sculptural details which affirms very strong connections with the Nidaros cathedral stone workshop.

4.1.2 Nidarholm's chancel and apse: Building-historical aspects

How do Nidarholm's newly-discovered chancel and apse fit into the known pattern of developments in Norwegian Romanesque church architecture?

The ambivalent historical evidence for an original foundation on the island by as early as 1028 and for a possible alternative date (for either an original foundation or a refoundation of the earlier monastery) within the first decade of the 12th century has been detailed above (1.4.). The architectural evidence consists of a portion of the eastern end of the chancel of the church (in effect its presbytery), built with coursed rubble, and the eastern apsidal end of an attached structure, a possible side-chapel, built with ashlar masonry. Archaeological evidence points to two successive building phases: the apsidal structure was built up against the N. wall of the chancel, its foundation trench cutting the lowest excavated graveyard level which had accumulated against the standing chancel wall. The monastery's 13th-century seal, which ostensibly shows a round church with towers (Fig. 7), forms a further much-cited piece of evidence.

The mortared coursed-rubble technique employed in the chancel is known from the earliest surviving Norwegian stone churches, although its use persists throughout the 12th century. Likewise, its square-ended plan is typical of the Romanesque period as a whole, and is a particularly popular form in the local region. Of the chancel's internal dimensions we have only an approximate estimate of its width: 6.4m. Its full length is unknown. If its width is anything to go by, it was by no means small, comparing favourably with that of the chancel of the large parish church at Værnes, for example (fig 47, 2).

In common with the chancel's square-ended ground plan, the apse is a characteristic feature of early Norwegian stone-church architecture, though again it persists in use throughout the Romanesque period. As a form it makes its first rare appearances in Norway during the years around 1100, although its wider application appears to take place towards the middle of the 12th century. In a local context, the earliest application of the form may have been in the side-chapels which were added to the square chancel of Olav the Gentle's Christ Church. If a theory put forward by Gerhard Fischer is correct, then these chapels were given apsidal eastern ends at

about 1100 (Fischer, 1965, 32) (Fig. 46). However, apses are otherwise not a characteristic feature of Trøndelag churches.

The ashlar masonry technique used in Nidarholm's apse is typical of that employed locally from at least the beginning of the 12th century. Local masons, particularly those working in the Christ Church workshops, favoured soapstone and the production of comparatively small ashlar blocks. Nidarholm apse's small tight-fitting regular blocks of soapstone are perfectly consistent with local developments, although some exhibit external faces which are paradoxically somewhat crudely finished: perhaps some were produced by apprentices learning their trade during the early days of the cathedral workshop? As in the case of the coursed rubble of the chancel, the use of ashlar for building endured over a long period: it is consequently difficult to date a structure closely simply on the basis of building technique alone. However, it is perhaps unlikely that the use of ashlar masonry pre-dates the turn of the 12th century.

We can only speculate as to what the complete church may have looked like, both originally and with later additions and modifications. Possible alternative ground plans might include a narrow chancel adjoining a relatively broader aisless nave of the local regional type (e.g. Christ Church and Værnes parish church), or a transeptless basilica with an aisled nave, be it like the small church of St. Albans, Selje or the larger St. Swithuns, Stavanger (begun c. 1120). Alternatively, the church may have possessed a simple single-celled plan where chancel and aisless nave were of the same width, as at Munkeliv, for example (although Munkeliv's chancel was apsidal-ended). Further possibilities (though perhaps less feasible) include a basilica with transepts and perhaps even a crossing tower (both features of St. Hallvard's, Oslo, c. 1100), or a variant (such as St. Michael's, Tønsberg, with its aisless nave and projecting transepts/altar niches; Fig. 47, 5). As with many Trøndelag churches, it might also have possessed a western tower.

That indeed Nidarholm's nave and chancel were combined in a building of uniform width (see Berg's conjectural reconstruction, Fig. 48) is not unthinkable, especially in the light of near-contemporary developments in the fellow Benedictine church at Munkeliv (c.1110). The fully rectangular single-cell form has a long antiquity, particularly in Ireland and Norse contexts in Britain, where it was employed in the building of stone chapels and small churches during the 10th century and into the 11th century. A Norse connection exists on Iona, for example, where Magnus Bareleg's queen Margrethe may have built the small rectangular stone chapel of St. Oram (Fett, 1909, 10). However, although a form with an early history of application, rectangular churches are a long-lived phenomenon, and feature in Norwegian stone-church architecture throughout the Romanesque and Gothic periods.

There is absolutely no existing physical evidence to confirm that the church on Nidarholm originally took such a form, although the presence of a square eastern end does of course allow for the possibility (see note 1, end of chapter).

Another possibility mentioned is that the church was built on lines common to other stone churches in the district, with a broad aisless and transeptless nave and a narrower square or rectangular square-ended chancel. The earliest surviving stone church in the district is Olav the Gentle's Christ Church, the rectangular chancel of which was equipped with secondary side-buildings (a sacristy to the north and chapel to the south). These may have been either simple square-ended structures, in the Anglo-Saxon fashion, or may have been provided with apsidal eastern ends. Consequently, a ground plan of broadly comparable form and development was in place in the locality, possibly already by the beginning of the 12th century, and the corresponding pattern of structural development between Christ Church and Nidarholm, each with an original square chancel supplemented at a later date with secondary side-buildings, possibly with apsidal ends, may perhaps not be entirely coincidental (Figs. 46 and 49).

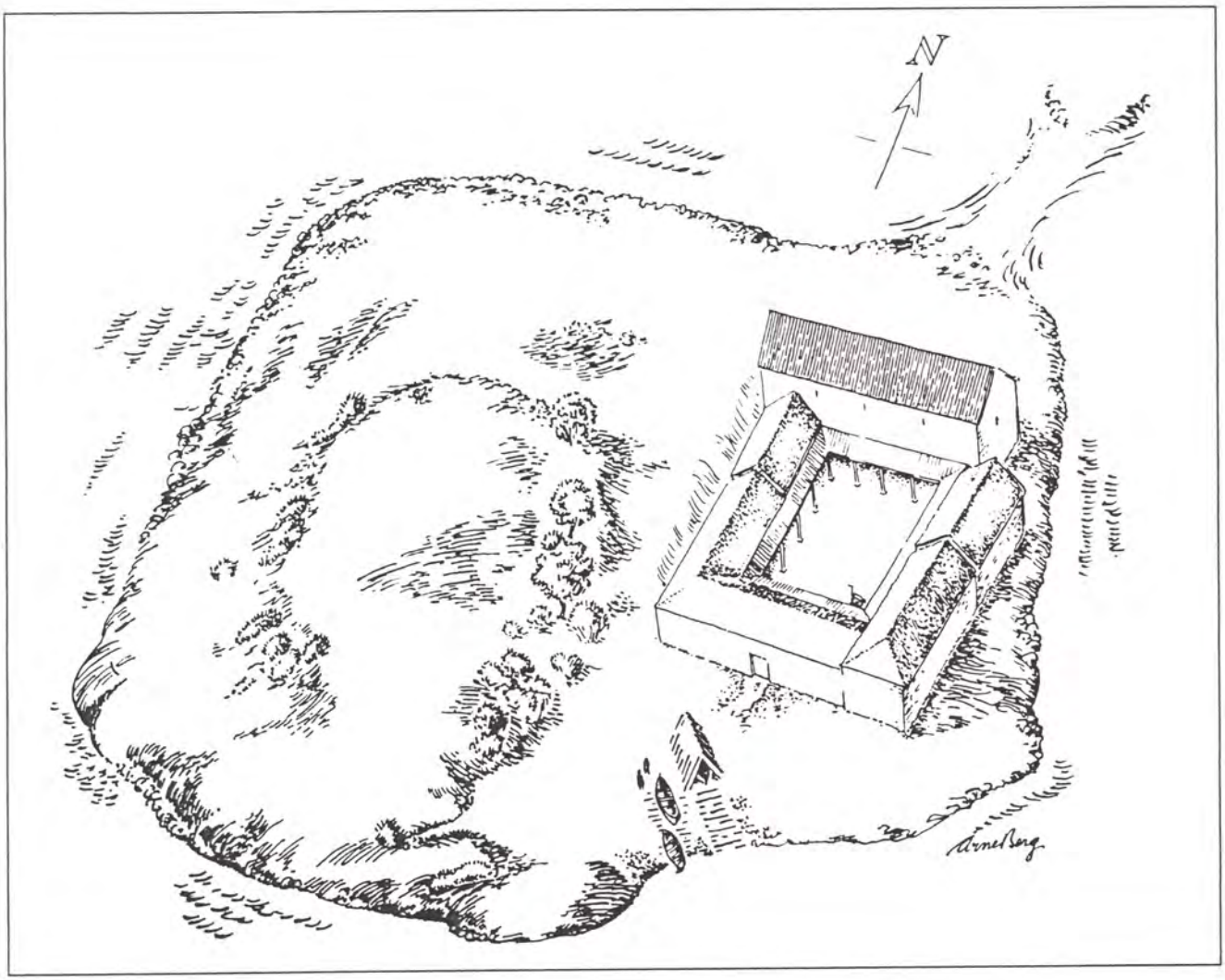


Fig. 48. *Nidarholm Abbey as it might have looked in the 12th century. Conjectural reconstruction drawing by A. Berg.*

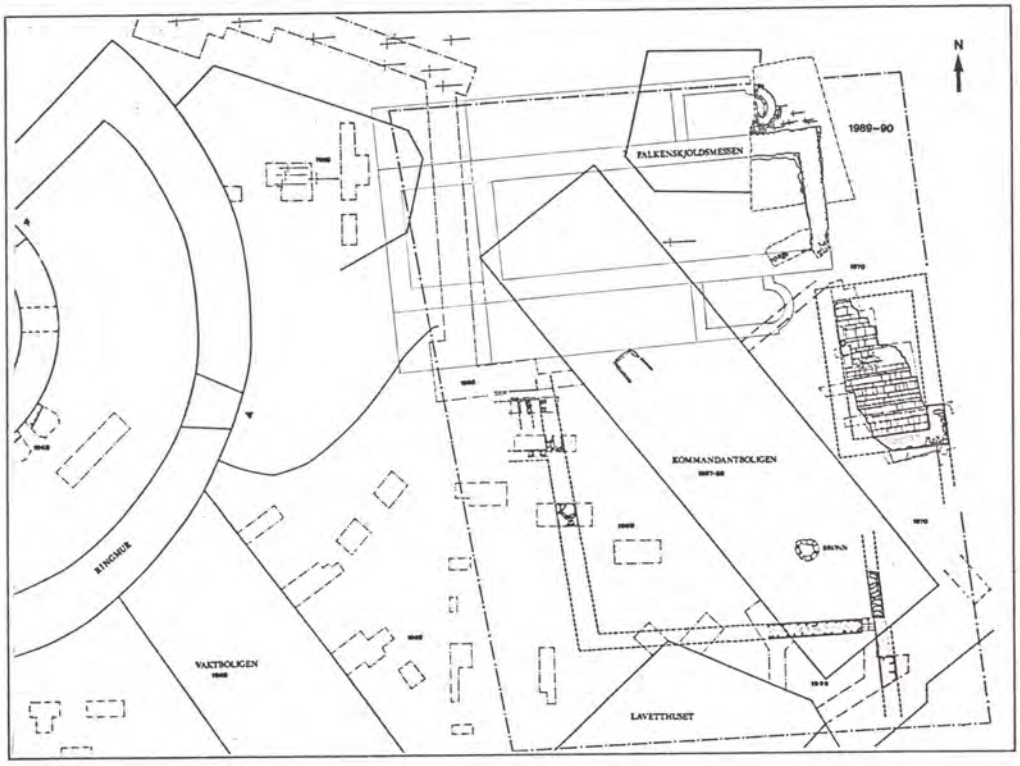


Fig. 49. *The monastic complex as excavated, with a conjectural reconstruction showing the possible extent of the church and alternative ground plans. 1:500.*

One might envisage Nidarholm's side-building as being similar in form and position to its conjectured counterpart in Christ Church, projecting out from the chancel wall and springing from the nave/chancel junction. The Nidarholm structure would have been smaller, though of ample dimensions to enable its use as a small side-chapel. Access would in this case have been through a small door in the chancel wall (Fig. 50). Apart from Christ Church, no other Romanesque church in the district appears to have possessed such a projecting side-chapel.

Another possible functional role for this side-building, arising from comparison with the late 11th - early 12th-century Benedictine monastery church at Veng in Denmark (Fig. 51), is that it housed steps to a second floor, in effect forming a stair tower. At Veng an aisless nave with a smaller square chancel and apsidal-ended presbytery is flanked by two low projecting square towers with apsidal projections running for the full height of the eastern walls. Unlike Nidarholm, however, these side-buildings are placed just to the west of the nave/chancel junction, and the apses stand some distance from the chancel, access being via the nave.

Might there have been another apsidal-ended structure on Nidarholm chancel's southern side? The area in question has been drastically disturbed, and there is no real evidence for such a structure (note 2, end of chapter). That only one such side-building existed would not be unparalleled - e.g. Gamle Akers parish church, Oslo (c. 1100) (Fig. 47, 7), with its single apsidal-ended side-chapel, perhaps closely comparable in form, size and location to that proposed for Nidarholm (Fig. 50). A southern side-building may have had implications for the arrangement of the E. range of claustral buildings (see 4.1.4., below).

Yet another possibility is that the church was built originally as a transeptless basilica incorporating a nave and two aisles (Fig. 49). The apsidal-ended structure would in that case have formed a chapel at the eastern end of the northern aisle. Again, Gamle Akers parish church, Oslo (c. 1100?) might form a contemporary parallel in such an instance.

While unlikely, it is perhaps just conceivable that the church may have had a fully developed Romanesque basilican plan, with aisled nave, transepts and even a crossing tower and western towers cannot be ruled out. Such plans were already established in England from the late 11th-early 12th century; for example, the turn-of-the-century Benedictine monastery church at Lindisfarne has apsidal-ended transepts. St. Hallvards, Oslo (begun c.1100?) is an early Norwegian representative, and its transepts have projecting apsidal-ended chapels lying parallel with the chancel. St. Michael's, Tønsberg (built pre-1150?) represents a simplification of the basilican plan with its transept-like projections, apsidal-ended, to either side of an aisless nave (Fig. 47, 5), and is thought to be modelled on the Benedictine monastery of Mont St. Michel.

To conclude this speculation, however, it should be remembered that the Benedictine Order set great emphasis on liturgy, and on singing and procession in particular. The form that the church would have taken originally, and as it developed, must have been to some extent determined by liturgical specifications, in accordance with available economic resources. The addition of the apsidal-ended side-chapel is likely testimony to such requirements, providing as it did extra space in the area of the choir, as well as a place for a side-altar, an important prayer-station during processions. The addition of this apsidal-ended side-building, an unusual feature in Trøndelag, should perhaps also be seen as expressive of Nidarholm church's especial status as a monastery church, and, if the parallels in masonry techniques and groundplan development are any real clue, the planners and builders of the monastery church may well have had close links with the nearby cathedral in Nidaros.

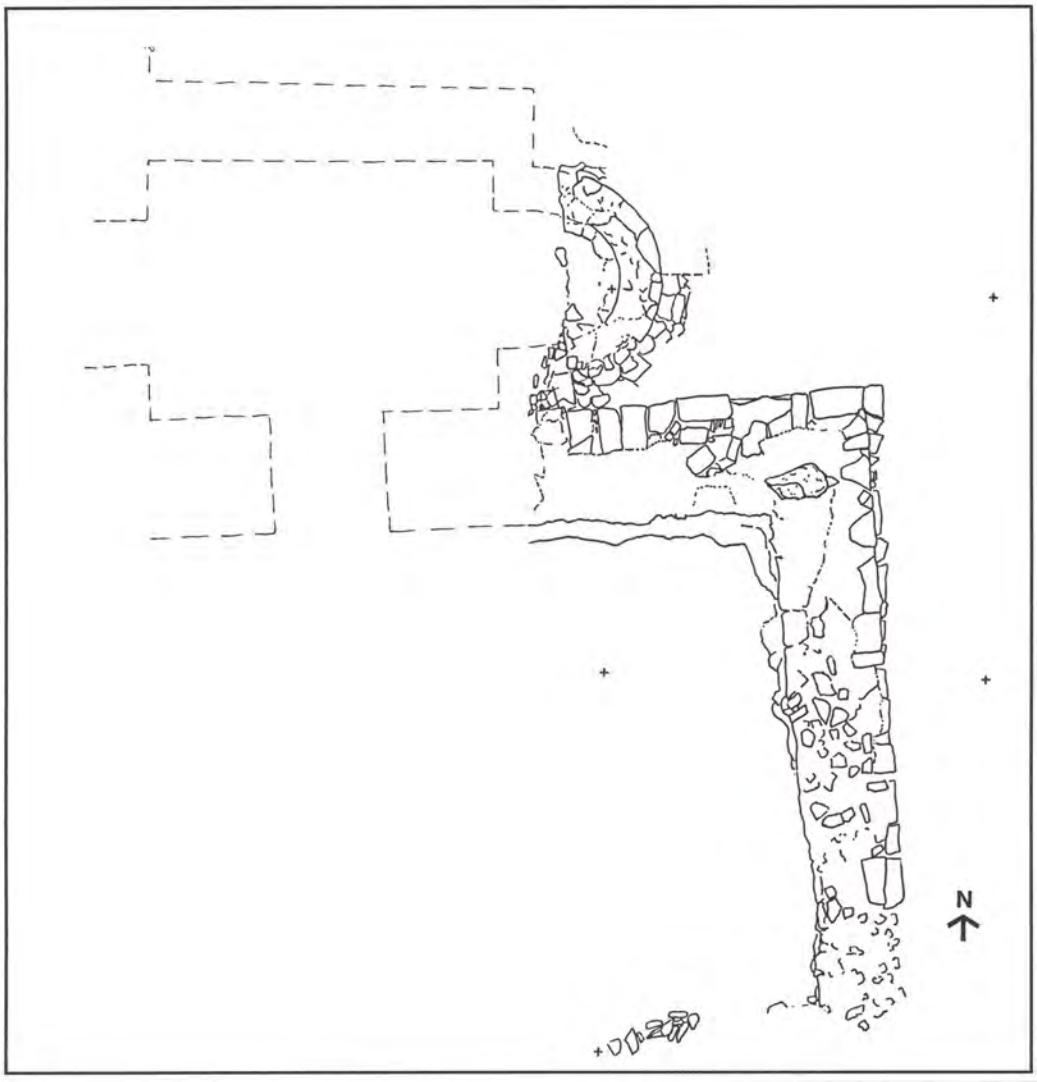


Fig. 50. *Reconstruction showing a possible form taken by the side-chapel represented by the apse. 1:100.*

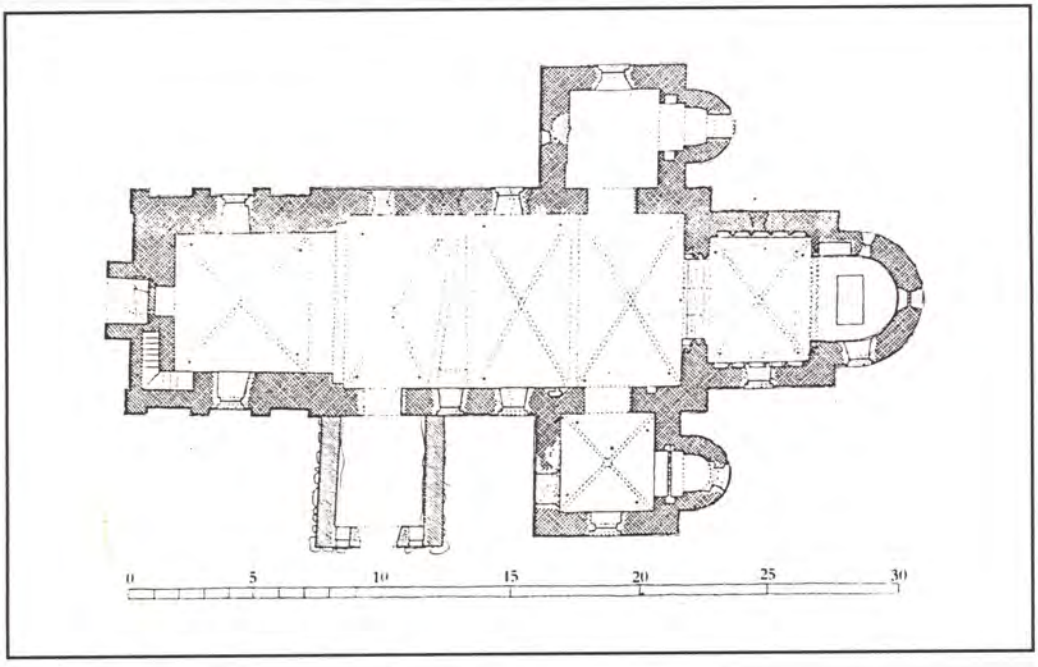


Fig. 51. *The ground plan of the Benedictine monastery church at Veng, Denmark, showing the projecting apsidal-ended side-buildings (from Danmarks Kirker, Århus, Fig. 8).*

The constraints imposed by the terrain may also have played a significant role. In particular, since the E. end of the church was placed on the very edge of the island, any desire to expand the area of the chancel by physically extending it in that direction would have been impossible. Hence the northerly extension by the addition of the apsidal-ended side-building (and perhaps even a southerly equivalent)?

4.1.3 The round-church theory.

The riddle of the monastery seal (Fig. 7) persists. However, the character of the newly discovered remains makes it practically certain that the representation of an ostensibly round Romanesque church on the monastery's 13th-century seal owes more to idealized artistic convention than any accurate portrayal of the church. At the time this seal was in use the square-ended chancel and apsidal chapel were already in existence. Although the exact form which the main body of the church took remains uncertain, the character of the chancel and the appended chapel make it highly unlikely that it was round. This said, a note of caution should be sounded, since it is not impossible that two churches stood on the island at the same time, although this again seems improbable: the unified monastic complex as discovered would have been sufficient for the needs of what must have been a very small community of monks, and the lack of other suitable sites within the restricted area of the island sets a natural limit to building work. The present round tower stands on the only other suitable site, and despite much theorizing on whether a round church lies incorporated within its fabric it seems more than reasonable to agree with the military historian Widerberg that there is as yet no reason to think other than that the tower was built from the ground up in the period 1671-4.

The possibility that the newly discovered apse forms part of a stair tower serving an upper floor has been raised. The theoretical presence of an equivalent stair tower on the S. side can be argued (see next section). If so, with two other equivalent towers at the W. end of the rectangular nave, there might have perhaps been some basis in architectural reality for the four towers depicted on the seal. However, on present evidence, these, like the rest of the church, would not have been round. Consequently, the seal would still have been somewhat over elaborated and idealized in this respect.

4.1.4 The monastic enclosure.

Only brief reference will be made here to the remains previously uncovered by Øivind Lunde to the S. of the church (see Lunde, 1977, 148-152). That the church and the claustral ranges form a compact and unified complex is striking (see Berg's conjectural drawing, Fig. 48 and Fig. 49). Of the other buildings in the three remaining wings, only the chapter house to the E. can be said with certainty to have been built predominantly of stone. There are some clues, notably a pillar base and a fragment of a round-headed window opening (Fig. 52), which may suggest (if they were indeed in primary association) that this building was erected during the 12th century.

While there may be some grounds for supposing that the chapter house was conceived and executed as part of the same building scheme as the church, its position in relation to the church is somewhat unusual. Although it occupies the position customary for a chapter house close to the church's E. end, it should be noted that for most of its width it projects well beyond the line of the chancel's E. wall. It is uncertain whether this reflects a deliberate formal arrangement or an arrangement dictated by, for example, topographical constraints. Given the cramped area of the enclosure, the provision of sufficient light for the monks' daily meeting room may have been

a motive for the chapter house's projection out beyond the high walls of the church. Alternatively, the need to utilize every piece of available space may have confined the enclosure to within a relatively small and irregular flatter area, forcing the builders to place the chapter house on the very edge of the island, projecting beyond the ideal position flush with the chancel. Although today the area immediately W. of the enclosure and E. of the knoll with the round tower is flat, there are signs that this area was artificially levelled during the post-medieval period. The monastic enclosure would therefore have been compressed into a very small area indeed.

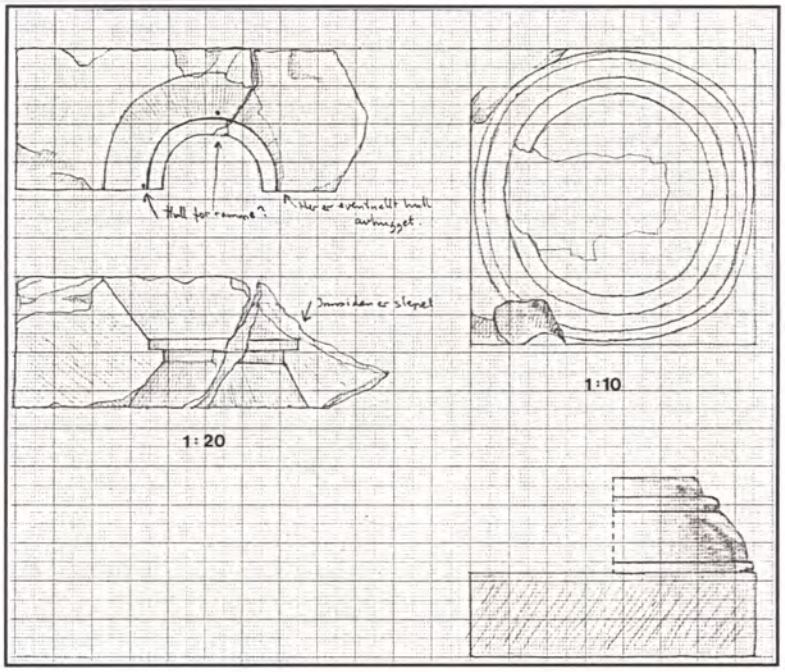


Fig. 52. *Scale drawings of the round-headed window fragment (left) and the pillar-base (right) found in Nidarholm Abbey's chapter house. Original drawings by L. Roede and C. Harris.*

If the normal arrangement occurred here, with the dormitorium placed in a second floor above the chapter house (a chapter **room** in effect), then some form of external arrangement allowing access to the church must have been installed, due to the displaced position of the chapter house/dormitorium and its physical separation from the church. Access might have been via stairs which emerged from the N. or W. wall of the first floor leading down to ground level and thence along the S. wall of the chancel to enter the church via a door at the junction of the choir and nave.[1]

It might be speculated that the presence on the S. side of the chancel of a putative side-building may have influenced the positioning of the chapter house, which therefore may have been built either at the same time as the apsidal extension (erected like its N. equivalent during a second building phase post-dating the chancel), or at some time after the apse stood finished.

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[1] I thank Øivind Lunde for his thoughts on this aspect.

It is not possible to say much about the other parts of the enclosure other than noting the somewhat less substantial nature of the walls which probably form groundwalls which supported wooden superstructures. There is no physical evidence for the provision of cloisters. A well lies in the SE. corner of the garth.

Excavations within the enclosure area have produced a number of artefacts, though comparatively few can be said with certainty to have been found in deposits or features which can be associated directly with the occupation of the monastery. Assemblages of medieval pottery were found in the monastic well and within a stone-built chamber-like construction which the excavators attribute to the monastery kitchen, although its alignment paradoxically appears to have more in keeping with the post-medieval arrangements.

Fig. 53. *Pillar-base found previously on Munkholmen: a so-called "water-holding" moulding. Paralleled in the open porch of Nidaros Cathedral's choir, dated by Fisher to the early 13th century, probably pre-1230 (Fischer 1965, p. 245 "F", p. 248) - A. T. Hommedal pers. comm.*

The bulk of medieval pottery sherds in the area of the enclosure are probably redeposited. Other finds, including various fragments of carved masonry, were scattered amongst deposits in the locality. The medieval pottery (recently re-examined by I. Reed) covers a date range from the mid 13th century to the late 14th/early 15th century (Appendix II), while a few pieces of carved masonry so far examined can be dated to the Romanesque period; in particular the aforementioned pillar base found in the chapter house, which is possibly of late 11th-early 12th-century date, and the window opening of 12th-century date. A particular problem with the loose stone material is that much stone was transported in from other places as building and filling material during the post-medieval period. On the other hand, it is perhaps fair to assume that any decorative fragments derive from the medieval structures on the island (fig. 53). None have been found securely incorporated within the original fabric of the medieval ruins, however (although the aforementioned window may have been observed in situ in the ruined S. wall of the chapter house by Bishop Neumann during his visit in 1827).

One of the island's most famous finds is a carved walrus-ivory crozier head (belonging to a former abbot?) with intricate animal and plant decoration, of possible local manufacture and datable to the mid 12th century (ill. in M. Blindheim, Middelalderkunst fra Norge i andre land, Oslo, 1972, 75). This was found in "a rocky cleft" in 1715.

4.1.5 The graveyard and burials.

The monastic graveyard lay to the N. of the church. A portion of it was located in the NE. corner of the 1989 site. 6 articulated inhumations and a large number of loose bones were found within the small explorative trench placed parallel with the chancel's N. wall (Figs. 8 and 17). No articulated skeleton was complete, and it is clear that the area was fully exploited during the medieval period, resulting in the disturbance of burials. A stratigraphical sequence of at least three graveyard levels was found, although bedrock was not reached (Phases I and II). These deposits comprise a lower shelly gravel deposited up against the chancel wall, a deposit which was cut by the foundation trench for the apse and which contained all the articulated skeletons (though these could have been cut down from a higher level). This was succeeded by a fresh deposit of soil, probably deliberately dumped to raise the level and increase the depth of the churchyard. All that remained of this were the patches of humusy soil adhering to the chancel and apse, the deposit having been disturbed during the cutting of burials to form the upper layer of earthy shelly gravel. The surface of this material in turn seems to have been disturbed, and contains slight evidence for its forming the level at which the graveyard stood during the dereliction and demolition of the church.

The articulated skeletons uncovered in the trial trench lay grouped closely against the exterior of the chancel's N. wall (Figs. 54 and 55), one in particular (**81**) lying with its head within the narrow space between chancel and apse. This area along the N. wall of the chancel is known to have been considered a special part of the graveyard.

The stratigraphic relationships of the individual skeletons are portrayed in the matrix (Fig. 14).

Arm positions were observable in three instances: two (**60** and **81**) had their arms folded over their abdomens, while one (**68**) had its hands placed together on the lower abdomen.

Fig. 54. *Plate showing the skeletons **44**, **60**, and **68** against the N. wall of the chancel. Looking S.*

Fig. 55. *Plate showing the skeletons **80**, **81**, and **82**. Looking W.*

Due to pressure of time, only three of the six skeletons were taken up for further examination (**60 "Grave 1"**; **68 "Grave 2"**; **44 "Grave 3"**). Apart from these, a large number of bone fragments were retrieved from the graveyard levels themselves as well as from the redeposited soils above them. The collected human (and animal) skeletal material has been analysed by Berit Sellevold of the Laboratory of Physical Anthropology, Universitets oldsakssamlingen, Oslo. Her report is included in Appendix III.

Briefly, the main results of this analysis are as follows: the three articulated skeletons were all adult males; one young, one middle-aged, and one elderly. In the mass of loose bone material from intact graveyard levels and redeposited contexts both sexes are represented, and includes infants, juveniles and adults. Clearly, the monastic graveyard was also used for lay burials.

No traces of wooden or stone coffins were observed, though a few possible coffin nails were retrieved from the graveyard. The common monastic practice was to bury members of the community in nothing but their shrouds and in unmarked graves. However, three fragmented (uninscribed) slabs of a micaceous stone were found in a secondary context, propped up against the demolished chancel wall (Fig. 20, "42", Fig. 21, mid-picture). These looked suspiciously like grave slabs. These may have derived from (lay?) burials in the graveyard or within the church, possibly removed from the latter during the clearance of its interior in the post-medieval period.

Although not confirmed during excavation, it is likely that bedrock falls away steeply to the east of the chancel wall. Consequently, if the graveyard extended east of this line for any distance, it is likely that, in order to maintain a level surface, the graveyard material was retained by a perimeter wall. Due to post-medieval disturbance, it is not certain whether the graveyard extended to occupy the area immediately east of the chancel, and even as far south as the chapter house's north wall. This is likely, however, and one might suggest that a north-running perimeter wall may have emerged from the north-east corner of the chapter house. During excavation, the stump of a mortar-and-rubble wall (**83**) was located mid-way along the chancel's eastern wall (Figs. 20 and 41). It is conceivable that this might have formed the point at which a perimeter wall terminated, having swung round prior to reaching the chapter house. However, it might just as easily comprise part of the post-medieval fortifications.

Inhumations have been found previously in other localities on the island. In 1940 Pastor Olav Digre was notified of the discovery of a number of skeletons during digging operations conducted by the German Army. Only one remained intact by the time he arrived. This lay between Falkenskjoldsmessen and Kommandantboligen. It is of particular interest in the light of the recent discoveries as it would appear that this burial must have lain within the walls of the church, possibly at the junction of nave and chancel? The other skeletons had been removed before Digre had time to record them, though it would appear that these lay in the open area just to the N. of Kommandantboligen (Oldsaksamlingens tilvekst 1940, 15939, p.22). In all, 8 skeletons were found. Lunde's excavations in 1968 and 1969 produced a further 13 skeletons situated to the north-east of the round tower. Clearly, all the remaining flatter part of the island along its northern side was given over to this function.

4.1.6 The dereliction/demolition of the church.

The historical sources are far from clear on this matter. The monastery may have burned and been abandoned as early as 1531, although Archbishop Olav Engelbrektsson used the island as his last refuge before fleeing the country in 1537. He left the island garrisoned and fortified with earth-and-timber ramparts. Following the Reformation, the island was allocated to the town magistrates as private meadowland and pasture for sheep. There is some unsupported speculation

(Widerberg 1936, 63) that the monastic ruin was plundered for building stone by the townsfolk during the island's long period of neglect from 1537 until 1658 and the Swedish occupation of Trondheim. It was the fate of many of Trondheim's stone churches following the Reformation to become quarries for the local citizenry; for example, in 1604 permission was granted to remove stone from Elgeseter priory. That the same fate overtook Nidarholm is, in this light, well within the bounds of possibility, although a certain amount of effort would have been necessary to transport stone from the island, perhaps making it a less attractive source of building stone.

Widerberg (1936, 49) and Rösoch (1939, 108) report that, on recapturing the island in 1658, the Norwegian garrison erected a fortified stone wall using stone from what was left of the ruin and placed three cannon on it which were used during the siege of the town.

A map of the same year drawn by the Swedish cartographer Naucler shows no sign of either ruins or standing buildings on the island (Fig. 9). However, this map's value as an accurate record in this respect can be called into question, since Naucler's interest may not have been caught by ruins or this island which was of little significance at the time. Another omission is the more accessible ruin of Elgeseter monastery to the S. of the town.

As far as the testimony of the physical remains is concerned, there is surprisingly little archaeological evidence for the destruction of the walls in terms of significant deposits of demolition debris which can be linked stratigraphically to such a process. The level which seems to have been exposed at the time of demolition is the disturbed surface of the graveyard (layer **35**, Phase III, Fig. 20), though this bears only occasional scattered stone debris. The walls of the chancel were demolished to their present height during the "lifetime" of this layer, although it cannot be securely determined archaeologically as to whether this took place in a single short episode of destruction or over a longer period of time. That the layer represents a possible maximum period of dereliction of 127 years between 1531 and 1658-9 seems likely from historical accounts and the testimony of associated datable artefacts, and the chancel walls and the rest of the church may have been demolished at any time during this period (for detailed argumentation, see 2.4. above).

4.2 Post-Medieval Activity in and around the Chancel.

That the people responsible for the post-monastic use of the area could still see the medieval church walls is evident, since they appear to have taken them into account during their activities here (Phase III; 2.4, above). Although it cannot be altogether certain whether the walls were standing at or near their original height or were down to their present level, perhaps just visible

in the surface of the upper graveyard level, at the time this work was initiated, there are clear indications that by at least the mid 1600s the chancel, and presumably the rest of the church, was demolished to its present level, and that the ruin was at that time the scene of secondary occupation.

The post-medieval activity includes the cutting of a right-angled ditch which runs parallel with and north of the chancel's E. wall for a short length before turning west at a right-angle towards the foundation ditch of the apse: clearly, the walls could be seen, if only perhaps as stumps poking slightly above ground. The ditch's function is a mystery; that it possibly comprises evidence for an early (the first?) attempt at fortifying the locality is a tempting hypothesis (see further below). The ditch seems to form an element in an inferrable sequence of activity which also includes the placing of a dry-stone wall on the demolished N. wall of the chancel, the insertion of one, or possibly two successive wooden floors in the cleared-out shell of the chancel,

and the accumulation of a humusy soil over the graveyard and the ditch and up against the dry-stone wall on the ruin. The wall and flooring belong to a simple shelter, or shack, installed within the emptied ruin, and although impossible to prove, the stratigraphic coincidence and clues in the dating evidence suggest that the cited activities occurred simultaneously in and around the demolished ruin, probably during the mid 17th century (for detail, see Ch. 2.4., Phase III).

Following the Reformation, the island reputedly lay derelict for 121 years, used only as meadowland. The aforementioned ditch cut the abandoned graveyard level, and was then sealed, together with the demolished N. wall of the chancel, by a humusy soil. It is plausible on stratigraphical grounds that the ditch was dug at a point in time close to the demolition of the church, and that these levels represent the 120-year hiatus between 1537 and 1658. The presence of a single possibly early 17th-century potsherd in the graveyard level beneath the humusy soil (if not intrusive) raises the possibility that the surface of the graveyard lay exposed well into the 1600s, and that the walls of the church were still visible above ground well into the 17th-century, the ditch being dug around the standing ruin. The finding of a coin of 1653/4 in a layer beneath a second(?) level of flooring within the modified chancel would seem to make add some weight to the impression that there was activity in and around the demolished chancel during the mid 17th century.

In what historical connection might this ditch have been dug and the primitive shack installed in the ruin (given that they were contemporary)? On the basis of a comparison of the historical and archaeological evidence they might have originated during any one of **three** relevant recorded episodes: during the defence of the island by a garrison loyal to the last Catholic archbishop of Trondheim in 1537; during the occupation of the island by Swedish forces in 1658; or in connection with the fortification work carried out by the Norwegians in 1658 and 1659/60.

The island was defended by a force of the archbishop's men during the final attack by the Danish fleet in 1537. There is a somewhat dubious (later) record of the monastery having already burned in 1531. There are certainly some traces of fire on bedrock in the interior of the chancel, from which a ^{14}C sample yielded a broad date range whose earliest part encompasses the 1530s (Phase III: Dating, and below). This uncertain evidence is all we have which hints at the possibility of a fire in the church by that date. Consequently it cannot be ruled out that the church was still standing (perhaps even as a burnt-out shell) in 1537 when one might have expected it and the rest of the monastic complex to have been used as the core of makeshift defences, the chancel's lowest traces of flooring (and/or the charcoal deposit?) perhaps being attributable to the archbishop's garrison. It is conceivable that, in an attempt to strengthen its position, the garrison threw up its provisional earth-and-timber ramparts around the perimeter of the standing buildings, a process which resulted in the formation of the right-angled ditch.

According to local historians (see above, Ch. 1.5.and 4.1.6.), the first activity on the island after the long period of post-Reformation neglect was undertaken either by the occupying force of Swedes in 1658, the garrison throwing up simple defensive earthworks, or by the Norwegians who erected a partially stone-built battery on the island during their attack on Trondheim at the end of the same year. The right-angled ditch may date from this activity, particularly if one puts weight on the testimony of the aforementioned early 17th-century potsherd in the layer it cuts. Again, it should be stressed that due regard of the walls seems to have been taken by the ditch diggers, so if the Swedes or Norwegians dug the ditch they must have been able to see the church ruin, though of course, by this time it may have been significantly denuded. Since the digging of the ditch, the erection of the shack in the already demolished and emptied chancel, and the subsequent formation of a humusy soil in the ditch and around the base of the shack's walling seem to form a closely related sequence, whose tentative dating evidence hints at 17th-century occupation, then the most fitting historical context for these first activities within and around the ruin would be either the Swedish or the Norwegian occupation of 1658. Either

garrison would have needed a temporary barracks, leading them to refurbish a pre-existing shelter (as represented by the tenuous first floor? - perhaps a shelter for hay-cutters in previous years?) by installing the more substantial second floor, perhaps even whitewashing the internal face of the N. wall - though this may have been done previously - and perhaps dropping the (Swedish!) coin and potsherds in the process. Alternatively, the Swedes or Norwegians might themselves have been responsible for emptying the ruin and constructing the shack within the emptied chancel (perhaps the existence of two floor levels might in this case reflect a two-phase process: i.e. Swedish occupation followed by Norwegian refurbishment?). The ditch and the shack would have comprised associated elements of their temporary defensive arrangements, probably centred on the demolished church.

Is it at all possible that the medieval church was still substantially intact in 1659 when the Norwegians built the first stone perimeter defences? The question arises in connection with the erection of this first low revetment wall (Fig. 10): one might reasonably ask where the stone for it was obtained. On reading Widerberg (1936, 51-54), there seems to be no reference in the surviving accounts to stone being transported in to the island. This is somewhat curious. It does seem that some outlay was made on quarrying equipment, and that the island's bedrock was planed off and outcrops quarried for stone. However, this does not seem to have been altogether successful, and on one occasion it is recorded that two quarrymen were paid-off after just 8 days' unfruitful work. The fact that vigorous attempts were made to quarry stone from the island's natural outcrops may indeed suggest that there was little left of the church by the time this building work started. Alternatively, and in the light of the fact that there appear to be no records of stone being transported in and that the attempts to quarry stone from the island's natural outcrops were possibly not greatly productive (if this is what the two temporary workmen were trying unsuccessfully to do), there is perhaps here just a hint that they had another exploitable source of stone on the island, namely the church, but that this source was quickly used up. The fact that the perimeter walls are recorded as having been rather low and insubstantial may perhaps imply restricted availability of suitable stone; in other words, the church and the island's natural outcrops provided only a limited amount of material which proved to be sufficient only for the building of low dry-stone walling.

The existence of the inserted shack within the shell of the ruin is not recorded on contemporary plans. It was probably not considered worth portraying, due to its provisional nature and function. Evidence for this shack's prolonged presence (even as a derelict) lies in the accumulation of the aforementioned humusy soil around the footings of its dry-stone northerly wall, and in the dumps of soil which eventually filled the chancel shell. The humusy soil seems most likely (by its humusy nature and on the slim testimony of the potsherd in the layer below it) to have formed between 1659 and 1689, when the island was garrisoned but fell into neglect. The shack itself seems to have lost its roof and lain open to the elements for some time. Dating evidence (Phase IV) points to the chancel interior's final in-filling with dumps of soil at a point in time during the later 17th-century (probably 1689-90).

This phase of renewed activity (Phase IV) is characterized elsewhere on the site (Fig. 29) by a two-stage back-filling of the line of the former right-angled ditch with rubble and mortar-laden earth, associated spreads of mortar, stone and earth over the graveyard area, and the filling of a localized hole (**13**) against the eastern side of the chancel with a very consolidated sequence of mortar and earth. This latter was clearly intended as a secure foundation for a superstructure, while the deposition of material in the line of the ditch and in the area of the former graveyard was clearly designed to heighten the area behind this structure. The finds content of these deposits included late 17th-century pot and clay-pipe fragments. That this work was associated with the building in 1689-90 of the structurally more solid and impressive star-shaped fortress seems a sound correlation. The consolidated "lump" on the eastern side of the chancel ruin

probably supported the perimeter wall's north-eastern return forming the new Gyldenløve's bastion. The dump of stones may, apart from filling the ditch, have acted as a firm foundation for a stairway and gun platform occupying the point of the bastion, such as represented on a later plan of 1821.

As regards the origin of the stone used to fill the ditch: Most comprised rubble, though occasional worked pieces of masonry were included, including a fragmented drum of a pillar. The accounts relating to the work of 1689-90 (Widerberg, 1936, 69-72) reveal that there was significant expenditure on the transportation in of stone for the new walls from surrounding localities as well as on the use of explosives on the island's own rock outcrops. (Stone was also brought in for the building of the round tower in the 1670s). The worked stones, and possibly some of the unworked rubble, may perhaps have their likeliest origin in the medieval church. However, this does not imply that the portions of the church were still standing and plunderable in 1689 - indeed, given the expenditure on transport of stone and quarrying operations, this seems highly unlikely. One possibility is that this stone possibly represents thrown-down dry-stone walling from the redundant 1659-60 perimeter wall, which, as suggested above, may have consisted partly of stones taken from the ruin of the church. Hence the worked stones amongst this redeposited rubble.

The building of the present-day Falkenskjoldsmessen took place in 1710, and its foundation was observed to cut the dumps of mortar-laden material in the chancel interior (Phase V, Fig. 31). Its rubble foundation appears to have been banked up against these dumped soils. It is conceivable that FM's N. wall preserves the line of the side-chapel's N. wall, although the evidence of the post-medieval right-angled ditch (**41**, Fig. 20) might counteract this, since it may have been aligned on the N.E. corner of the side-chapel, much as it was on the N.E. corner of the chancel.

No further building activity appears to have taken place in the vicinity until the 1820s (Phase VI), and a thick brown earth sealing the mortary deposits must represent further attempts at heightening this area behind the new polygonal perimeter walling.

Next to build on the island was the German Army during World War II (Phase VII, Fig. 33). They dug many trenches across the island, and one of these, filled with a brick-built water duct serving a cistern to the S. of Kommandantboligen, crossed the site from N-S. This impinged upon the apse, but otherwise did not cause much disturbance. In fact, it produced some unexpectedly interesting evidence in the form of a substantial number of large red medieval bricks. Some of these bore a stamped motif in the form of a crown (Fig. 56) which possibly denotes a Lübeck origin (S. W. Nordeide, pers. comm.). Where the Germans got these from is a mystery. One explanation is that they may have been brought in as ballast at any time from the medieval period up to 1940. Brick is recorded as being imported for the 17th-century building work on the island, though this came principally from Holland. However, it is not impossible that these bricks originated from the monastic ruin and perhaps even the church itself (deriving from later building work in the church). If parts of the church stood until the building of the first major stone defences in 1659, then the removal of these bricks at that time, and their re-use in, say, the new garrison buildings, and in particular the commandant's residence, would seem an attractive possibility. The brick could have been re-used yet again in the new stone residence of 1695. The Germans are recorded as having removed brick during their refurbishing of the residence: perhaps this explains their ultimate destination?

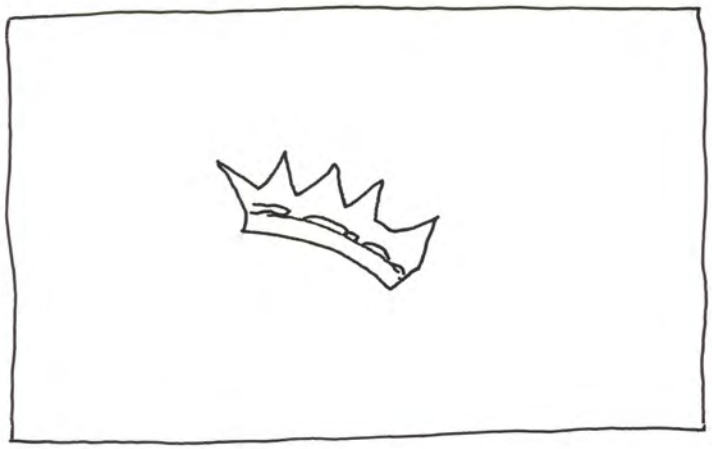

Fig. 56. Sketch drawing of medieval brick impressed with crown-shaped motif.

Notes for chapter 4.

1. There is, however, some extremely tentative and unconfirmed evidence which may hint tantalizingly at such a formerly rectangular ground plan: on reading a report on Pastor Olav Digre's observations during trench digging by the German Army in 1940, the following information came to light:

" Among other things a 25m-long trench was also dug from Kommandantboligens kitchen, east of it and in a north-north-west direction between "Falkenskjoldshus" and Kommandantensbolig to a point east of the entrance or walkway of the outer rotunda of the tower.... The ditch was only 0.50m broad and was dug down to bedrock throughout its length..... Between "Falkenskjoldshus" and Kommandantboligen were found **in two places the remains of walls in mortar,** but so little was visible that it was therefore impossible to decide what they might have been. **The walls appear to have been 2 metres thick"** (my emphasis) (Oldsaks-samlingens tilvekst, 1940, nr. 15939, 22-23).

Digre's own report, with drawings, is reportedly deposited in the museum's archive. However a search for it has proved fruitless, and since we only have these words to go on it is impossible to know exactly where these two thick walls were located along this trench. However, if Digre's phrase "between "Falkenskjoldshus and Kommandantboligen" implies a stretch of trench confined to the immediate area between these two buildings and not extending into the open area north of KB, then these two walls take on a particularly interesting significance in this context (see Fig. 49 and the proposed extent of a rectangular church). They are very likely, given their mortared character and thickness, to be medieval: note the mortared character of the chancel walls and the comparable thickness of 2 metres for the northern wall's base. It is therefore tempting to suggest that Digre's walls might represent the north and south walls of the church building, his northern fragment lying across the entrance to the little passage between FM and KB, and his southern fragment just to the south of the burial he recorded beside KB. If this is the case then the position of the northern wall in particular might strengthen the case for the church's original construction as a long rectangular building of uniform width. Further, in 1988 the present author

recorded the shallow length of a very narrow cable trench (0.30m wide) which crossed the area just to the N. of the passage between KB and FM: the German trench noted by Digre could be seen clearly in profile at this point. Although no mortared stonework was encountered in this shallow trench, the German trench was seen to cut a deposit of earthy mortar. A surface of laid beach boulders was observed against the door of FM. The latter was of differing character to the medieval walling recently encountered, and is possibly a post-medieval feature. However, the mortar deposit takes on an added significance when viewed in the light of Digre's discoveries.

2. However, in his report of excavations undertaken here in 1970, Lunde records the following:

"One should be aware that in 1969 the line of an old cable trench was dug up through the area in an east-west direction" (the narrow trench on Fig. 49). "This trench has of course destroyed a great deal, but in its sides one could see the remains of a wall running across the line of the trench - unfortunately, this was not documented in 1969. According to the description the wall should be part of the 17th-century bastion, since the remains lay far out" (i.e. to the east of the chapter house) " but since the trench" (dug in 1970 to the NE. of the chapter house) "produced no positive result, these wall remains may have lain further west. In that case these remains should be part of the monastic complex". (Lunde, 1970: archive report). This should be borne in mind for future excavations in this particular area.

5. CONCLUSIONS

As will have been gathered from the foregoing chapters, this small site produced a significant and complex body of archaeological evidence relating to medieval and post-medieval activity on the island. It might perhaps be judicious to summarize the principal pieces of evidence, and to consider their particular implications for the interpretation of events in the island's history.

The medieval period

The newly-discovered abbey church lies across the N. wing of the small monastic enclosure. That in structural terms it is consistent with the Norwegian Romanesque stone building tradition is evident from its surviving fabric and groundplan. Archaeological evidence reveals that it underwent a degree of structural development during its lifetime. The square-ended chancel, built of coursed rubble, is the earliest part of the building (as revealed to date). At some point following its completion a small ashlar-built apsidal structure, evidently the E. end of a side-building, was erected against its N. wall. The apse in all likelihood held a side-altar, and formed part of a larger side-chapel. The exact size and form of this side-building is not known; that it extended the ground area of the church in the region of the choir is clear, and, in addition, it is not impossible that it comprised a two-storey extension. Likewise, the exact size of the chancel, and the manner in which it joined with the nave can only be guessed at. However, if the measurable breadth of the chancel is anything to go by, it was by no means small. The church's complete ground plan, in its original and modified forms, eludes us yet. A number of possible forms have been proposed above, though none can be given preference with any major degree of confidence. A simple rectangular single-cell plan for the first phase church might perhaps be conjectured, or alternatively, given the nature of local architectural developments, a form based on the popular regional two-celled ground plan with its earliest known roots in Olav the Gentle's Christ Church in Trondheim/Nidaros. The second phase church, with at least one, and possibly two apsidal-ended side-buildings, also carries possible formal echoes from Christ Church. Certainly, the ashlar masonry technique used to construct the apse bears all the hall-marks of regional masonry techniques centred on the cathedral workshops. However, one should at this stage be wary of drawing too close parallels with Christ Church and local developments in the sphere of church building. The physical location, special function and status of Nidarholm Abbey's church may have indeed given rise to a special relationship with the planners and builders of the cathedral: however, the precise temporal relationship cannot yet be determined as we have no available means of dating Nidarholm's building phases other than in the most general terms provided by the constructional techniques employed.

For the same reasons of function and status, this particular Benedictine church's form and development may well have been principally determined by the Order's particular liturgical requirements. It is perhaps in this light that the addition of the apsidal side-building should be viewed, with its provision of a side-altar and extra space neighbouring the choir. Economic considerations might also have played a role, with, for example, restricted resources expended on the original church, with a later opportunity for expansion facilitated by fresh financial input as the monastery accumulated wealth. Yet another, not insignificant determining factor exists in the constricted nature of available building space on this small island: this would have dictated the size and lay-out of the original groundplan to some degree, and, since the E. end of the church was perched on the very edge of the island, any future enlargement of the church could not have taken place in that direction. As a result of factors such as these the church building's form may have developed along altogether different lines to those evident elsewhere in the region. This said, it is nonetheless tempting to point out the broadly comparable (though largely hypothetical) strands and stages in the structural development of the E. ends of Olav the Gentle's Christ Church and St. Laurence's, Nidarholm.

In what historical context might Nidarholm's church best fit theoretically (given that we cannot date the building closely). Are the building remains in any way consistent with developments known by either of the two historical dates (1028 and c. 1103) cited for the monastery's foundation?

The antiquity within Norway of the building technique employed in the chancel is shadowy. That it is consistent with that known from the earliest known stone churches which emerge at the end of the 11th century is conceivable. However, Christ Church was possibly not the first stone church to be built in Norway, and its building method and plan may arguably have greater national antiquity. The potential for an early application of such building methods lies in the putative mid 11th-century stone hall and churches attributed respectively to Magnus the Good and Harald Hardråde. If stone architecture on Romanesque lines was in place in Nidaros by this time, then the possibility of a very early stone church on Nidarholm is perhaps a little less hard to envisage. If work was begun on Nidarholm's stone chancel during the reign of Knut the Great, then it would be by far the earliest recorded stone church in Norway, pre-dating Harald Hardråde's reputed stone churches of St. Mary's and St. Gregory's in Nidaros by about a generation, and Christ Church by two. While the special circumstances which may conceivably have engendered such an early and unique manifestation of ecclesiastical stone architecture rest in Knut's particular status and the central political importance of Nidaros and Trøndelag at the time, it would be difficult, given the nature of known contemporary developments within Norwegian (and indeed Nordic) church architecture, and the ambivalent character of the remains, to associate Nidarholm's stone church with a monastic community founded on the island as early as 1028. If indeed such a community existed at this time, there is no firm historical or architectural reason to think otherwise than that, in common with other churches of the Missionary Period, its church was built of wood. Furthermore, if we follow Lange's suggestion that this early community may have been short-lived, the possibility exists that not even any substantial wooden structures were built here. No archaeological evidence has yet been found on the island which is even remotely suggestive of the presence of wooden buildings pre-dating the stone structures in the area of the monastic complex. (This said, it would be dangerous to state categorically that no such earlier buildings existed, given the radical effects of subsequent building activities on the island and the fact that there is only comparatively thin soil cover over bedrock).

The weight of circumstantial evidence, historical and archaeological, arguably lies with the later date for the original foundation, or at least the establishment at that time of the first stone buildings on the island. That Sigurd Ullstreng built the first stone church, here represented by the chancel, and possibly erected the rest of the claustral buildings at the same time, seems the most feasible alternative. Wealthy though he was, his resources may not have stretched to the building of an elaborate church, and in its first phase, as suggested, it might have adopted a simple and economical form. The later addition (in the course of the same century, and possibly within its first half) of the apsidal-ended side-building might be expressive of the acquisition of substantial resources, either accumulated over time as the monastery built up its financial base in the district, or as a result of the contribution of resources by another wealthy individual. In this context it is perhaps pertinent to note that, in 1135, the dethroned king, Magnus the Blind, was given sanctuary in the monastery.

The post-medieval period

In addition to the rather inconclusive nature of the church ruin's testimony regarding the date of the monastery's foundation, the archaeological material provides only an incomplete picture of the monastery's final years and demolition. No pottery has been found which can be securely dated to the 15th and 16th centuries. Given the apparent decline in the abbey's fortunes after the Black Death, this is perhaps consistent, although the community seems to have been active and in place up until at least the putative fire of 1531, and, although it was not mentioned in official

documents after that date, it had a named abbot (though possibly absentee) in 1535. The archbishop fortified and garrisoned the island in 1537, although by this time the church might have already been a burnt-out shell. Radical post-destruction alterations in the chancel interior, as well as the lack of attributable and datable in situ destruction deposits, deny us clear insight into the transition from abbey church to ruin. The church's stone may have been plundered piecemeal following the Reformation, although if local historians are correct, there may have been surviving medieval walling as late as 1658. Indeed, a tentative case can be made for the final demolition of the ruin and the use of the stone in the low perimeter wall erected by the Danish-Norwegian army in 1658-9.

Evidence of activity in and around the ruin shows that, even if it was in a depleted condition, the church still had a role to play following its abandonment by the monks. A ditch, probably a defensive feature associated with earthworks thrown up in either 1537 or, perhaps more likely, 1658, was dug around the exterior of the chancel clearly respecting its layout, implying that the church building, in whatever condition, itself formed the core of the defensive works. In addition (possibly either simultaneously or directly afterwards), the interior of the chancel was cleared out, and a wooden floor installed. In fact, possibly two floors were installed in the cleared-out chancel: the first floor may have been inserted while the chancel walls were higher, although it may, as the floor which succeeded it certainly did, have formed part of a primitive shack or hut inserted into the demolished shell of the chancel. The archbishop's garrison may have been responsible for the first level of flooring in a possibly burnt-out chancel. An alternative early re-use of the former chancel during the early post-Reformation period may have been as a primitive shelter for shepherds and hay-cutters. However, the main indications are that the demolished chancel was modified in this manner in the mid 1600s. The Swedish or the Norwegian garrisons of 1658-9 may have been responsible for the erection of the shack which possibly provided a make-shift barracks. Either garrison may also have been responsible for the digging of the ditch to the NE. of the ruin as part of their recorded defensive works. Following this, the ditch and the former graveyard became overgrown and the shack fell derelict, although the chancel shell was only finally deliberately buried from view under dumped soil and mortar during the major reorganization of the area associated with the new defensive works of 1689-90.

POSTSCRIPT: Future Excavations and the Fate of the Ruin

In view of the remaining uncertainties about the exact character and date of the church, any future possibilities for excavation should be enthusiastically welcomed. The principal zone of interest in this respect comprises all the flat area to the west of Falkenskjoldsmessen (FM) (as well as under its flooring), and the areas between FM and Kommandantboligen (KB) and south between KB and the remains of the chapter house. It is felt that, despite disturbance and shallowness of soil, there are likely to be some structural remains here (e.g. those observed by Digre between FM and KB in 1940). Even if the lines of the church's walls are preserved only in the form of patches of mortar on bedrock, it will be possible to gain important insight into the ground plan of the church. Further dating material may also be recovered.

The ruins are at present covered with matting and soil. The island would benefit greatly from their conservation and presentation to the public, these few medieval remains providing a necessary counterpoint to the overwhelmingly post-medieval character of the island. The opening up of the whole area behind FM and KB to reveal the chancel and chapter house together would require the provision of some form of protective roofing, perhaps of glass. A complementary exhibition area (in FM?), presenting finds and information about the island's long and eventful medieval history, would provide a further source of interest for the island's many summer visitors.

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APPENDIXES I - III

M = Medieval included

CONTEXT	PHASE	POT	CLAY PIPE	GL.TILE	UNGL.TILE/ BRICK	COINS	IRON NAILS	DIV. IRON	NON-FERR. METAL	SLAG	NON-FERR. NAILS	MORTAR SAMPLE	MASONRY	GLASS	DIV. BONE	OTHER	COMMENTS
1	VII	X(M)	X	X		X	X					X	X		X		
5	VII	X(M)	X												X		
6	VI	X(M)	X	X			X	X		X		X	X		X	Bone comb shell sample	Metal naval button
7	VII				X(M)												Med.bricks stored on island.
8	IV														X		
9	VI														X		
11	IV	X					X								X		
14	IV	X					X								X		
15	IV														X		
16	V	X	X	X										X	X		
17	V	X	X				X								X	Bone knife-handle	
19	IV	X								X					X		
20	I											X					

Table showing character of finds per context

CONTEXT	PHASE	POT	CLAY PIPE	GL.TILE	UNGL.TILE/ BRICK	COINS	IRON NAILS	DIV. IRON	NON-FERR. METAL	SLAG	NON-FERR. NAILS	MORTAR SAMPLE	MASONRY	GLASS	DIV. BONE	OTHER	COMMENTS
22	IV						X						X		X		Pillar fragm.
24	IV		X	X								X			X		
25	IV	X	X		X		X								X		
26	IV			X													
27	IV														X		
28	IV														X		
29	III						X	X					X		X	Soil sample/ 14C sample	Pointed metal tool
31	IV			X			X						X		X		Pillar fragm.
33	II											X	X				
35	III	X			X		X	X							X	Stone frags.	Iron ring
37b	IV	X(M)			X										X	Stone frag.	
38	IV	X	X		X		X								X	Shell sample	
39	IV?														X		
40	IV	X	X					X						X	X	Shell sample	
43	II						X					X			X		
44	II						X							X		Soil sample	

Table showing character of finds per context, continued

CONTEXT	PHASE	POT	CLAY PIPE	GL.TILE	UNGL.TILE/ BRICK	COINS	IRON NAILS	DIV. IRON	NON-FERR. METAL	SLAG	NON-FERR. NAILS	MORTAR SAMPLE	MASONRY	GLASS	DIV. BONE	OTHER	COMMENTS
45	IV	X(M)			X		X							X	X		
46	V								X								Perfor. bronze object
47	III														X	14C sample	
48	III							X						X	X		
50	III	X			X	X						X			X	Shell sample/ 14C sample	
51	IV						X										
58	III															Soil sample/14C sample	
60	II															Soil samples	
61	II														X		
62	III				X												
65	III				X												
68	II														X	Earth samples	
69	II														X		
71	II														X		
84	Loose finds of diverse masonry fragments.																

Table showing character of finds per context, continued

APPENDIX II - THE POTTERY. By Ian W. Reed.

Introduction.

The 1989 excavations on Munkholmen produced a total of 116 sherds of pottery, of which 108 (93%) are post-medieval, the remaining 8 are medieval (tab.1). 74% of the assemblage, 86 sherds including 5 of the medieval sherds, come from layers redeposited during the 19th and 20th centuries. In addition to this a further 17 sherds found within the chancel come from layers used to backfill this area in the 18th century.

The Phases.

The distribution of the pottery per phase is shown in table 1. From this it can be seen that the first two phases are aceramic. One small sherd of Low Countries whiteware (N111887) from context **35** is from the upper graveyard surface at the interface between phases II and III, this is dealt with under phase III.

Phase III
Only 5 sherds of pottery were found in this phase, all of which come from a redeposited layer, they are either shattered or waterworn. The types present Low Countries (Dutch) redware and whitewares, together with South Scandinavian/German redwares and whitewares would seem to indicate a 17th-century date.

Phase IV
A total of 21 sherds were recovered from this phase. Of these 4 are in layers redeposited during the construction of the star-shaped bastion in 1689/90, while the remaining 17 are from layers sealed by the construction deposits for the bastion.

Of particular interest here are 9 conjoining sherds of Staffordshire slipware found in contexts **37B**, **40** and **45** and 2 conjoining sherds of a Low Countries redware cauldron from contexts **38** and **40**. The occurrence of these suggest that these layers form part of a primary rubbish deposit laid down prior to the construction of the bastion which seals them.

Phase V
This phase produced only 4 sherds of pottery, all of which are from redeposited contexts. Three of the sherds are of local lead-glazed earthenware which should be 18th century or later, which is consistent with the dating of the phase which post-dates the construction of Falkenskjoldsmessen in 1710.

Phase VI
A total of 55 sherds were found in this phase, all of which come from context **6** which was redeposited probably during the 19th century. Of particular relevance to the dating of this phase is part of the base of a fine whiteware bowl (N111867) with a partial maker's mark **..TERSON**. This was probably produced by Patterson & Co. of Newcastle who were in operation between 1830 and 1904.

Worthy of note in this phase are two sherds of North Devon gravel-tempered ware (N111863 and N111871).

Phase VII

The redeposited contexts **1** and **5** produced a total of 31 sherds. The types and their numbers are shown in table 1.

Discussion.

The pottery types found in this assemblage are entirely consistent with pottery assemblages from excavations within the city of Trondheim. This is mirrored even in the small group of residual medieval sherds where Grimston is the dominant type, as on most excavations in Trondheim. However, there are a number of problems connected with this assemblage, particularly that of residuality. We know that material has been moved around the island in connection with the construction of the various phases of fortifications. What we do not know, however, is how much material has actually been brought to the island from elsewhere. It may be assumed that some of the post-medieval pottery found in this assemblage has actually been used by the garrison of the fortress, but it also seems possible that much of it may have been brought in with soil intended for use in the fortifications. Documentary sources mention the transport of stones, sand and turf from the mainland. No mention is however made of other material. Consequently it is impossible to quantify exactly what pottery was used here and what was brought in.

The medieval sherds in this assemblage can be divided into four types: Grimston, South Scandinavian redware, Lincoln type II ware and Langerwehe stoneware, all of which were either current during the late 13th century or the 14th century. Because of their residuality they serve no other purpose here other than confirming the occupation of the island during this period, if they do not originate from material imported to the island.

The post-medieval groups include Low Countries redware, South Scandinavian and north German redware, German whiteware, tin-glazed earthenware, North Devon gravel-tempered ware, Staffordshire slipware and local lead-glazed earthenware.

The largest post-medieval group is the local lead-glazed earthenwares and slipwares. These account for c.28% of the assemblage. A number of vessel forms are represented including bowls, dishes, plates, storage jars and lids. Because of the fragmentary nature of the material it is difficult to date these precisely. One vessel (N111862) has part of a date, ..24, presumably 1824, and indeed a general 19th century date for this group seems likely.

The second largest group is the Dutch redware which, together with the slipwares, accounts for c.19% of the assemblage. The bulk of this material is again redeposited but would appear to cover the period from the late 17th century to the mid-18th century.

The Staffordshire slipware forms, on the basis of a sherd count, the third largest group, c.8% of the assemblage. These sherds (N111889, N111892, N111894), however, join together to form the larger part of one vessel, a single-handled cup with reversed slip decoration. The vessel is interesting in that it is possibly the earliest piece of Staffordshire slipware found in Trondheim.

The two sherds of North Devon gravel tempered ware are also interesting to note as this is only found in very small quantities within the town.

The pottery from previous excavations.

During the excavations carried out in 1968 and 1969 a total of 526 sherds of pottery were found, 121 of which were later discarded. Of the remaining 406 sherds c.47%, 192 sherds, are medieval and many of them appear to be part of the primary deposition and not residual. This is particularly true for the material found within Kommandantboligen. The material is characterised by numerous large sherds and many conjoining to form substantial parts of vessels. With a few exceptions the opposite is true of the post-medieval material; here there are mainly single sherds, many worn or weathered.

The medieval pottery has been divided into 14 types. On the basis of a sherd count the largest of these is the Grimston-type ware accounting for c.36% of the assemblage of medieval sherds. This is followed, in descending order, by the South Scandinavian redwares, the near-stonewares, the Siegburg wares and the Langerwehe-type wares. This comparison is however slightly misleading as several groups have numbers of sherds conjoining to form large parts of vessels. On the basis of a maximum vessel count the order is as follows: Grimston-type, South Scandinavian redwares, Langerwehe, near-stonewares and Toynton-type ware. The 12 sherds of Siegburg only represent 2 vessels. It is interesting to note that of the maximum 94 medieval vessels represented only 4 of these were cooking-vessels, the rest being tablewares, namely jugs and drinking vessels.

The medieval assemblage includes one sherd of Saintonge polychrome ware (context **152**), the largest of only a handful of sherds of this ware found in Trondheim.

The earliest medieval wares appear to be the shell-tempered ware (contexts **162** and **190**) and the Scarborough-type ware (contexts **65** and **70**), both of which were current during the mid-13th century. The latest medieval wares are probably the Langerwehe and Siegburg stonewares, some of which probably belong to the late 14th or early 15th century.

The post-medieval wares have been divided into 22 groups, the largest of which is the local lead-glazed earthenware, c.36% of the post-medieval assemblage. The second largest group is the Dutch redwares, including both plain and slip-decorated, followed by the South Scandinavian and North German redwares, the Dutch whitewares, the English black-glazed wares and the tin-glazed earthenware. Of more unusual pieces in the post-medieval assemblage mention should be made of the base of a Chinese red stoneware vessel with impressed stamp from context **45**.

It is not possible to closely date any of the post-medieval pieces. Some may well be late 17th century, while the bulk are 18th century and later.

Conclusions.

It is perhaps largely fortuitous that there are no pottery finds which can be related to the earliest and latest phases of the monastery's history. With regard to the earliest phase, pottery is relatively common in the town and one would therefore expect it to have been in use in the monastery.

The later history of the island presents a number of problems. The sequence of events is well documented, so there are no problems in this respect, those arising being largely methodical. The greatest of these is that of representativity: how many of the finds from the 17th and 18th

centuries were actually used on the island and how much was brought in amongst earth intended for use in the fortifications? It will probably prove to be impossible to answer these questions.

There is apparently one interesting correlation between the archaeological and the documentary evidence. In A.D. Jørgensen's bibliography of Prisoner of State Peter Schumacher Griffenfeld (1635-99) (1894, p.476-77) there is a reference to a bequest made in his will of a teapot of brown *terra sigillata*. The reference is illustrated with a photograph of a teapot with decoration in the form of a moulded Chinese dragon. From the description and photograph this would appear to be Chinese red stoneware: one can only speculate as to whether the piece of red stoneware found in Kommandantboligen might have been part of a service owned by Schumacher.

	I	II	III	IV	V	VI	VII
Grimston				1		2	1
Lincoln						1	
Scandinavian redware			1				
Langerwehe				1			1
Dutch redwares			1	5		12	4
Dutch whitewares			1				1
South Scand. redwares			1	3		4	
German whitewares			1		1		
Tin-glazed earthenware						5	1
Westerwald stoneware						1	
Other stonewares						2	
Lower Rhine slipwares							2
Staffs. slipware				9			
Local lead-glazed wares					3	16	14
North Devon ware						2	
Pearlware						5	
Fine whiteware						3	3
European porcelain							3
Modern redwares						1	
Diverse redwares							1
Unidentified				2		1	
Total			5	21	4	55	31

APPENDIX III - SKJELETTMATERIALET FRA NIDARHOLM KLOSTERRUIN 1989.

Av Berit J. Sellevold

INNLEDNING.

Nidarholm klosterruin på Munkholmen i Trondheimsfjorden ble arkeologisk undersøkt i 1988-1989. I mai-juni 1989 ble området mellom Falkenskjoldsmessen og de ytre forsvarsverkene utgravd, og østre ende av koret i klosterkirken ble avdekket. Like nord for denne del av ruinen ble det funnet et relativt uforstyrret område av klosterets kirkegård. Det ble avdekket tre graver in situ, nær inntil korveggen, og det ble samlet inn en mengde skjelettrester fra forstyrrede graver. Dessuten var der også store mengder dyreben.

Både gravene in situ og de omrotete gravene er datert til middelalder. Det har vært aktivitet og forstyrrelser i området helt fra 1200-årene og frem til våre dager. Det har vært tilført masser til kirkegården. Kanskje stammer en del av dyrebenene fra slike påførte masser.

I det følgende skal først gravene gjennomgåes og diskuteres. Dernest kommer en summarisk gjennomgang av de omrotete skjelettrestene, med en oversikt over antall individer representert i benmaterialet. I Vedlegg I gis en katalog over skjelettmaterialet i gravene. Vedlegg II består av tabeller over mål for individene i gravene. Vedlegg III er en liste over det omrotete benmaterialet.

MATERIALET.

Høsten 1990 ble det innsendt 12 kasser med ben til Oldsaksamlingens Laboratorium for Fysisk Antropologi. Kassene inneholdt tre kategorier ben: 1) skjelettrester fra uforstyrrede deler av tre graver, 2) omrotete skjelettrester fra et ukjent antall forstyrrede graver, samt 3) en mengde dyreben og dyrebensfragmenter. Skjelettdelenes bevaringstilstand varierte fra meget velbevart til helt fragmentert og ødelagt.

UNDERSØKELSEN.

Arbeidet med materialet har foregått som følger:

1) Ben fra omrotete lag var pakket i nummererte poser. Først ble alle dyreben frasortert: det var betydelige mengder. Dyrebenene ble veid og pakket i egen, merket emballasje, for videreforsendelse til undersøkelse ved Zoologisk Museum i Bergen.

2) Skjelettmaterialet fra de tre gravene var pakket separat. Undersøkelsen av disse er beskrevet nedenfor.

3) Menneskebenene fra de omrotete gravene var pakket i nummererte poser, og disse ble gjennomgått med henblikk på følgende faktorer:

   a) antall individer pr. lag
   b) aldersbestemmelse
   c) kjønnsbestemmelse.

RESULTATER

Gravene

Knokler og tenner fra individene i de tre gravene er undersøkt antropologisk: Individene er blitt kjønns- og aldersbestemt, og der er foretatt antropologiske målinger i henhold til Rudolf Martins system.[1] Sykelige forandringer, tannforhold og arvelige trekk er registrert. I Vedlegg I gis en katalog over materialet i hver grav. I Vedlegg II finnes skjematiske skjelett-tegninger der de tilstedeværende knokler og -fragmenter samt tenner er avmerket. Målene og forekomsten av en rekke nonmetriske trekk gis i tabeller i Vedlegg III. I tabellen over nonmetriske er det ikke regnet ut frekvenser, fordi det tallmessige grunnlaget er så spinkelt.

Grav 1 var delvis ødelagt, og skjelettet var skåret over ved hoftene slik at bare overkroppen var bevart in situ. Graven inneholdt skjelettrestene av en ung voksen mann, som døde i en alder av ca. 25-30 år. Han var ca. 179 cm høy, med middels lang og bred hodeskalle (såkalt mesokran). Knoklene er relativt spinkle, og bærer ikke preg av kraftig muskelarbeid. Der er ingen spor etter sykelige forandringer hverken i knokler eller tenner. Dødsårsaken kan ikke bestemmes ut fra de bevarte skjelettrestene.

Grav 2 var også delvis ødelagt. Skjelettet var skåret over omtrent ved kneleddene, og begge legger og føtter manglet. Graven inneholdt skjelettrestene av en middelaldrende mann, ca. 40-50 år da han døde. Han var ca. 172 cm høy, med kort, bredt kranium (brachykran). Der er spor etter noe slitasjegikt (osteoarthrose), og kraftige spor etter tannkjøttsbetennelse (periodontitt), spesielt i overkjeven. Der er ingen karies. Knoklene er spinkle, med svakt utviklede muskelfestespor. Dødsårsaken kan ikke bestemmes.

Også Grav 3 var delvis ødelagt slik at bare kraniet, venstre skulderparti og en del av ryggsøylen lå in situ. Resten av skjelettet manglet. Graven inneholdt skjelettrestene av en eldre mann, mellom 55 og 70 år da han døde. Kroppshøyden kan ikke beregnes. Hodeskallen er kort og bred (brachykran), med en kraftig underkjeve med "firkantet" hake. Der er kraftige slitasjegiktspor i nakkehvirvlene (osteoarthrose), og der er utbredte og kraftige spor etter tannkjøttbetennelse (periodontitt). Der er ingen karies. Dødsårsaken kan ikke bestemmes.

Diskusjon.

Alle tre graver inneholdt skjelettrester av menn: en yngre voksen, en middelaldrende og en gammel. Siden de var gravlagt så nær inntil korveggen ligger det nær å formode at disse mennene tilhørte Nidarholm kloster, at de var munker, evt. prester. (Se nedenfor).

Kroppshøyder: For to av mennene kunne kroppshøyden utregnes, til henholdsvis 179 og 172 cm. De var således ikke spesielt høye. De hadde heller ikke noen særlig robust benbygning: de var nærmest spinkle. Til sammenligning kan vi se på skjeletter fra middelalderens Olavskirkes kirkegård i Trondheim. I en periode fungerte denne kirken som klosterkirke for franciskanerbrødrene. Gjennomsnittshøyden for seks menn fra klosterfasen av denne kirkegården var 172.3 cm, med variasjon mellom 168 og 181 cm.[2] De to mennene fra Nidarholm kloster passer godt inn blant disse. Hvis man sammenligner med individer fra sognekirkegårdsfasen av Olavskirkens kirkegård (dvs. Fase C, utgravd i 1984-1985[3,4]) viser det seg at gjennomsnittshøyden for 31 menn var 172 cm, altså temmelig lik både mennene fra Olavskirkens klosterfase, og fra Nidarholm klosters kirkegård. Benediktinermunkene og franciskaner-brødrene lignet altså på mennene fra sognekirkegården når det gjelder kroppshøyder.

Gravene lå tett inntil nordveggen på klosterkirkens kor. Det var ikke 'hvem som helst' som ble begravet på en så prominent plass. En slik plassering var gjerne forbeholdt mennesker med en spesiell tilknytning til klostret eller kirken. Det kunne være prester, munker, proventfolk, eller velstående personer som hadde donert penger eller eiendommer til klosteret. I middelalderen ble munker og prester gjerne rekruttert fra de bedrestilte lag av samfunnet. Man kunne kanskje derfor forvente at de gravlagte på klosterkirkegården ville være store, høye og velutviklede mennesker. Det er en klar sammenheng mellom sosiale lag og kroppshøyder: Store kroppshøyder og velutviklete knokler finnes hos individer fra de bedrestilte sosiale samfunnslagene der individene har fått rikelig og god ernæring i oppvekstårene. Slike høye, velutviklede individer er f.eks. funnet på middelalderkirkegården ved Hamar domkirkeruin. Men de hittil undersøkte individene fra to av klostrene i Trondheim har ikke avdekket tilsvarende høye individer.

Kranieform: Kranieindeksene kunne utregnes for alle tre individer: to av mennene var kortskallet, mens en var mellomskallet. Til sammenligning kan nevnes at det blant mannlige individer fra klosterfasen i Olavskirkens kirkegård var en kortskallet og to mellomskallete, mens to kvinner var mellomskallet. Det er litt overraskende å finne utpreget kortskallede kranier i norsk middelaldersk skjelettmateriale: Den langt overveiende del av hittil undersøkte kranier fra denne tidsperiode er mellomskallede, liksom nordmenn flest idag. Men kanskje vil vi oppdage at det er en større variasjon bl.a. i kranieform etterhvert som flere og flere skjelettmaterialer blir undersøkt?

Omrotete ben.

I Vedlegg IV gis en liste over resultatene av gjennomgangen av de omrotete ben, arrangert etter lagnummerering. Jeg har valgt å analysere benmaterialet fra hvert enkelt lag for seg. Således fremkommer det et maksimum antall individer.

Det ville også være mulig å bestemme det minste antall individer, eller det sannsynlige antall individer, blant de omrotete benene. Men slike analyser er svært tidkrevende. Jeg måtte derfor vurdere om verdien av den informasjon som kan fremkomme gjennom slike analyser står i forhold til innsatsen og tidsforbruket. Dyperegående analyser er, for det første, meget tidkrevende, og for det andre, avhengig av dokumentasjonen av funnkontekstene for de omrotete ben. Spørsmålet om lagenes diskontinuitet eller mulige samhørighet er av vesentlig betydning for tolkningen av dette materialet. Siden det har vært en hel del aktivitet på denne kirkegården i form av flytting og påføring av jordmasser samt annen omroting fra 1200-tallet og frem til idag er det antagelig ikke mulig å komme frem til en forståelse av forholdene mellom de omrotete lagene som ville kunne bidra til tolkningen av de omrotete benene.

Ved å se hele det omrotete materialet under ett og vurdere hvert enkelt benfragment i forhold til samtlige fragmenter kunne man kanskje komme frem til både et minimum og et sannsynlig antall individer blant de omrotete benene. Man kunne komme frem til et tall for minimum antall individer ved å telle overlappende knokler eller fragmenter. Og man kunne komme frem til et sannsynlig antall ved å vurdere kjønns- og alderskriterier i de enkelte fragmenter. Allikevel ville det være umulig å avgjøre hvorvidt to ulike benfragmenter (f.eks. fra rygghvirvler og føtter) hørte til et og samme individ. Verdien av disse resultatene ville ikke på noen måte stå i noe forhold til den tid man måtte anvende for slike analyser. Ut fra bl.a. slike hensyn ble det derfor bestemt (i samråd med arkeolog) at analysen av de omrotete skjelettrestene skulle holdes på det nivå som er beskrevet i denne rapporten.

De omrotete benene er derfor undersøkt lag for lag. Med alle mulige forbehold er jeg kommet frem til at analysene av de omrotete menneskeben gir et "minste maksimum" av 64 personer. Dette er resultatet når man holder de nummererte lagene separat fra hverandre og teller antall individer innenfor hvert lagnummer. Jeg understreker at dette er et resultat som vil kunne endres betydelig, avhengig av hvordan lagene tolkes, og hvilke metoder som anvendes.

Minst 53 av individene er voksne. 11 er barn og ungdommer. Det er både menn og kvinner representert, men for de flestes vedkommende har det ikke vært mulig å kjønnsbestemme fragmentene. Tabell 1 gir en oversikt over materialet.

Aldersgruppe	Menn	Kvinner	Ubestemt	Totalt
Infans I (0-6 år)	-	-	2	2
Infans II (7-12/14 år)	-	-	4	4
Juvenis (12/14-18/19 år)	1	-	3	4
Adultus (20-35 år)	3	1	5	9
Maturus (35-55 år)	8	2	4	14
Senilis (over 60 år)	1	-	1	2
Voksen (over 20 år)	7	4	18	29
Totalt	20	7	37	64

Tabell 1. Kjønns- og aldersfordeling blant omrotete ben.

Jeg har ikke regnet ut den prosentvise forekomst av f.eks. menn og kvinner, eller barn og voksne i det omrotete materialet. Jeg vurderer antallet individer som såpass usikkert at det ikke har noen hensikt å analysere resultatene kvantitativt. Det er interessant nok å se at individer fra alle aldersgrupper er representert, fra de helt små, spede barn til meget gamle personer. Det synes å være en svak overvekt av middelaldrende voksne i forhold til yngre voksne. Imidlertid er antallet av voksne som ikke kan aldersbestemmes til en av de tre voksne aldersgruppene stort, og hvis disse hadde kunnet bli mer nøyaktig aldersbestemt ville resultatet kanskje ha endret bildet radikalt. Det er klart langt flere menn enn kvinner blant de omrotete voksne individene, og dette er da heller ikke så overraskende, tatt i betraktning at kirkegården tilhører et munkekloster. (Skjeletter av barn kan ikke kjønnsbestemmes.)

I denne undersøkelsen av omrotete ben har jeg av tidsmessige årsaker ikke lagt vekt på å registrere patologiske forhold og anomalier. Men det skal nevnes at der er en del tilfeller av patologiske forhold som det kunne være interessant å se nærmere på i en annen forbindelse. Blant de omrotete ben finnes det f.eks. enkelte knokler som er meget store og robuste. Der er også spor etter meget sterk slitasjegikt (osteoarthrose) på enkelte knokler (ved siden av normalt forekommende moderate slitasjegiktspor). Der er også tilfeller av opphelede benbrudd m.m.

Nidarholm var et mannskloster. Det er interessant å konstatere at også kvinner og barn ble begravet på Nidarholmklosterets kirkegård. Også på andre kirkegårder tilhørende munkeklostre og -konventer i Norge kan vi finne kvinner og barn blant de gravlagte (f.eks. Selje kloster (barn),[5] og Olavskirken i Trondheim (kvinner og barn)[6]). Dette må henge sammen med klostrenes og konventenes forhold til det øvrige samfunn. Begravelser er så viktige begivenheter at de ikke blir utført tilfeldig. Begravelse på en klosterkirkegård må bety at den gravlagte hadde en spesiell tilknytning til klosteret. Kvinnene og barna på disse munkeklosterkirkegårdene kan for eksempel ha vært knyttet til klosteret enten gjennom økonomiske bånd eller gjennom slektskapsbånd.

VEDLEGG I: KATALOG OVER SKJELETTMATERIALET I GRAVENE.

Grav 1: Mann, 25-30 år (aldersgruppe Adultus).

Bevart materiale: Ikke komplett, ubrent skjelett. Det meste av underkroppen mangler. Følgende knokler er ikke tilstede: korsben og haleben (os sacrum, os coccygis), det meste av begge hofteben (ossa coxa) (noen få fragmenter er tilstede), begge lårben (femora), skinneben (tibiae) og leggben (fibulae), begge kneskåler (patellae), samtlige knokler fra begge føtter. Dessuten mangler noen få fingerknokler.

Tilstand og mål: Kraniet er noe ødelagt, men en del mål kunne tas. Største lengde er 187 mm, største bredde 145 mm. Fra det postkranielle skjelett kan største mål (M 1) tas på følgende knokler: Høyre overarm (humerus) 350 mm, venstre 347 mm; høyre spoleben (radius) 263 mm, venstre 262 mm; høyre albueben (ulna) 283 mm, venstre 279 mm.

Kjønn: Individet er bestemt til mann, basert på utseendet av kraniet og de lange rørknoklene fra overkroppen.

Alder: Alderen er bestemt til mellom 25 og 30 år, altså en ung voksen. Kraniesømmene er sammenvokste men tydelige i hele sine lengder; det er moderat tannslitasje, og det er ingen spor etter slitasjegikt (osteoarthrose).

Patologi og anomalier: Det er ingen større sykelige forandringer på knoklene. En tann fremviser et begynnende kariesangrep, og der er moderate forekomster av tannsten. Flere tenner fremviser små emaljeknusninger eller avskallinger.

Kroppshøyde: Kroppshøyden beregnet ut fra største lengde på høyre overarm er ca. 179 cm (utregnet etter Trotter & Glesers regresjonsligning).[7]

Kranieindekser: Det eneste kranieindekset som kunne regnes ut var kraniets bredde-lengde-indeks, som er beregnet til 77,5. Dette vil si at kraniet er mellomskallet (mesokran: middels bredt i forhold til lengden).

OPPSUMMERING:

Individet i Grav 1 var en yngre voksen mann, ca. 179 cm høy, med middels langt og bredt hode. Graven var skåret over ved hoftene, og hele underkroppen mangler. Det var ingen større sykelige forandringer hverken i knokler eller tenner.

Grav 2: Mann, 40-50 år (aldersgruppe Maturus).

Bevart materiale: Ikke komplett, ubrent skjelett. Følgende knokler mangler: nederste halvdel av begge lårben (femora), begge kneskåler (patellae), begge skinneben (tibiae) og leggben (fibulae) og samtlige knokler fra begge føtter. Dessuten mangler noen få knokler fra begge hender.

Tilstand og mål: Kraniet er noe ødelagt, men største lengde kunne måles til 171 mm, og største bredde til 141 mm. Fra det postkranielle skjelett kan største lengde (M 1) måles på følgende knokler: høyre overam (humerus) 325 mm, venstre 326 mm; høyre radius (spoleben) 245 mm.

Kjønn: Individet er bestemt til mann, basert på utseende av kraniet, hofteben og postkranielle knokler. Knoklene er relativt små og spinkle, men med umiskjennelige mannlige trekk.

Alder: Alderen er bestemt til mellom 40 og 50 år. Kraniesømmene er delvis utviskede, og det er relativt kraftig tannslitasje.

Patologi og anomalier: Det er lettere spor etter slitasjegikt (osteoarthrose) i bryst- og lendehvirvler. Tre av brysthvirlene er lettere sammentrykt, men dette har ikke medført bevegelseshemninger. Der er ingen karies, men tildels kraftige spor etter tannkjøttbetennelse (periodontitt), særlig i overkjeven.

Kroppshøyde: Beregning av kroppshøyden er basert på største målte lengde på overarmene (humeri), og var ca. 172 cm (Trotter og Glesers regresjonsligning).
Kranieindekser: Det var mulig å beregne kraniets bredde-lengde-indeks, som var 82.5, samt høyde-lengde-indeks, som var 71.3. Dette vil si at kraniet er kortskallet(brachykran: kort i forhold til bredden), og middels høyt (i forhold til lengden: orthokran).

OPPSUMMERING:
En middelaldrende mann, ca. 172 cm høy, med kort, bred og middels høy hodeskalle. Han hadde lettere spor etter slitasjegikt og utbredte spor etter tannkjøttbetennelse, spesielt i overkjeven.

Grav 3: Mann, 55-70 år (aldersgruppe Maturus-Senilis)
Bevart materiale: Ikke komplett, ubrent skjelett. Det meste av skjelettet mangler. Følgende knokler er tilstede: Kraniet (inkl. underkjeven), venstre krageben (clavicula) og skulderblad (scapula), fragment av brystbenet (sternum), samt fragmenter av noen venstre ribben (costae); halshvirvlene I, II, IV, VI og VII, samt fragmenter av de fleste brysthvirvlene og første lendehvirvel.
Tilstand og mål: Knoklene er fragmenterte. Enkelte mål kunne tas på hodeskallen: største lengde er 181 mm, største bredde er 148 mm.
Kjønn: Individet er bestemt til mann, basert på utseendet av kraniet, som har klare mannlige trekk.
Alder: Alderen er bestemt til mellom 55 og 70 år: kraniesømmene er nesten utviskede, og det meget sterk tannslitasje. Der er en del slitasjegiktspor i rygghvirvlene.
Patologi og anomalier: Det er tildels kraftige spor etter slitasjegikt, spesielt i nakkehvirvlene. Der er ingen karies, men utbredte og kraftige spor etter parodontose. De fleste tenner fremviser små emaljeknusninger ("chipping").
Kroppshøyde: Kroppshøyden kan ikke beregnes.
Kranieindekser: Det var mulig å beregne kraniets bredde-lengde-indeks: 81.8, det vil si kortskallet (brachykran: kort i forhold til bredden).

OPPSUMMERING:
En eldre mann. Kroppshøyden kan ikke beregnes. Han var kortskallet. Det var tildels kraftige slitasjegiktspor i nakkehvirvlene, og utbredte og kraftige spor etter tannkjøttbetennelse, men ingen karies.

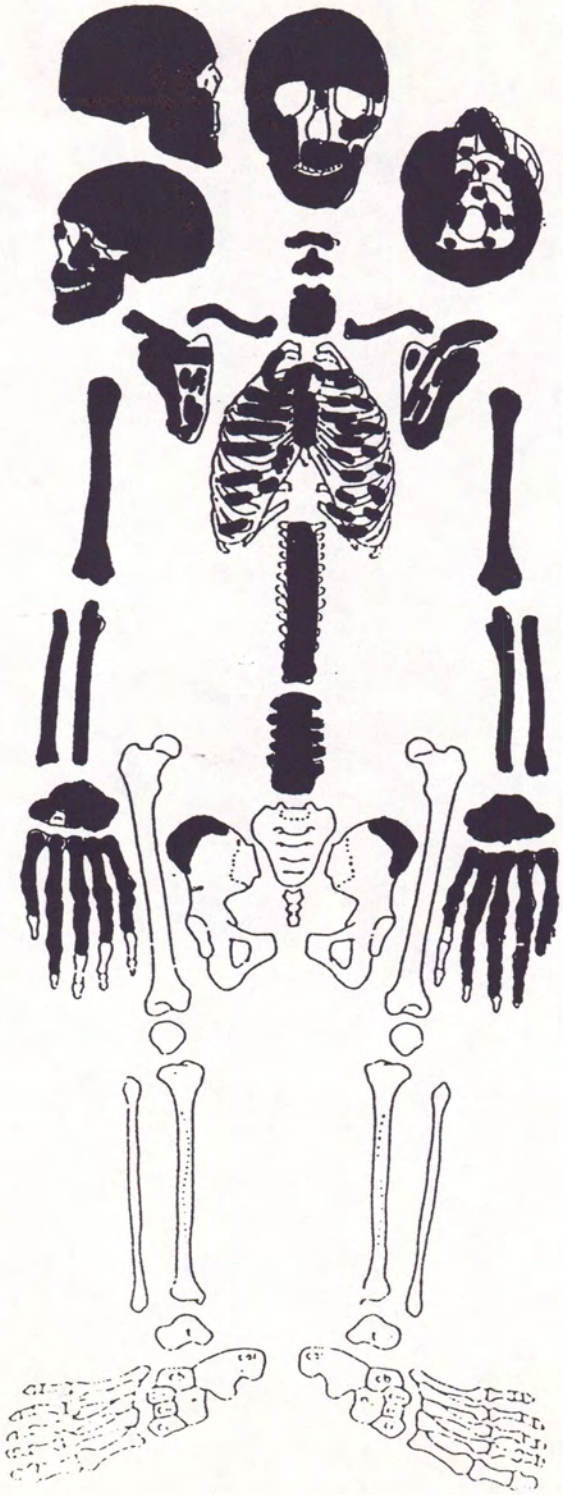
VEDLEGG II

NIDARHOLM KLOSTERRUIN

Utgravninger på Munkholmen 1988-1989

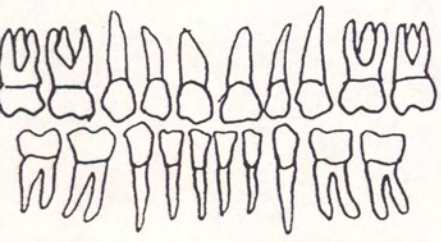
GRAV 1 Lag 60, N.112 201 OLFA 9/90

Kjønn: Mann Alder: 25-30 år

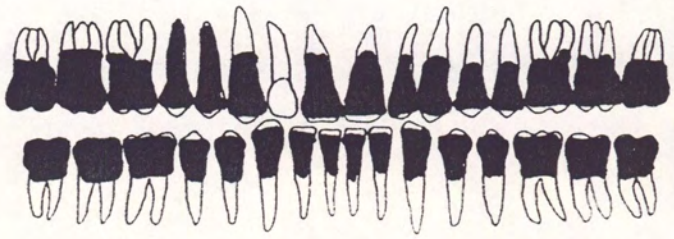


os hyoideum

DECIDUOUS TEETH



PERMANENT TEETH

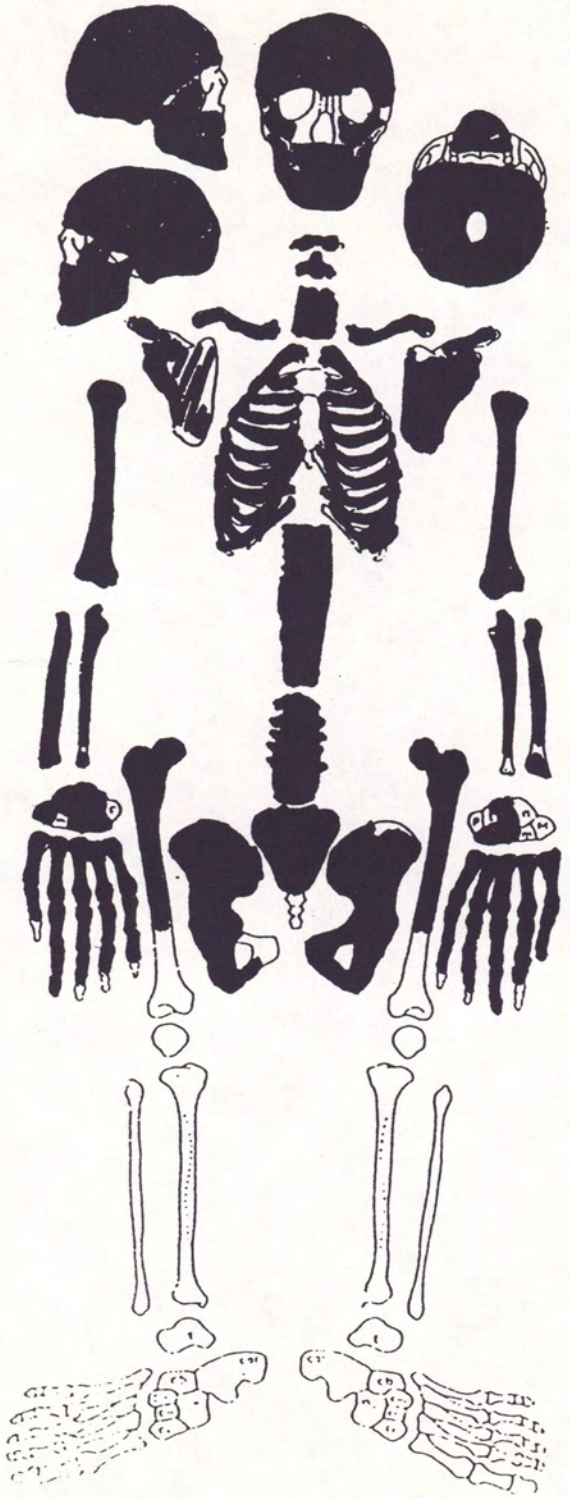


NIDARHOLM KLOSTERRUIN

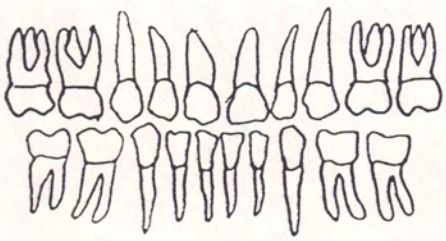
Utgravninger på Munkholmen 1988-1989

GRAV 2 Lag 68, N.112 200 OLFA 9/90

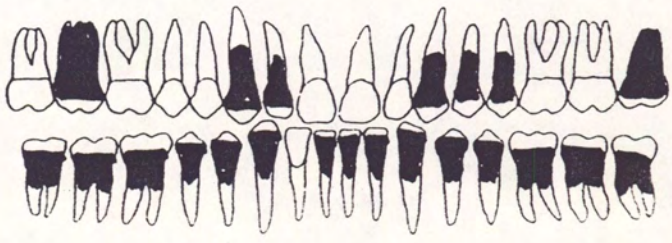
Kjønn: Mann Alder: 40-50 år



DECIDUOUS TEETH



PERMANENT TEETH

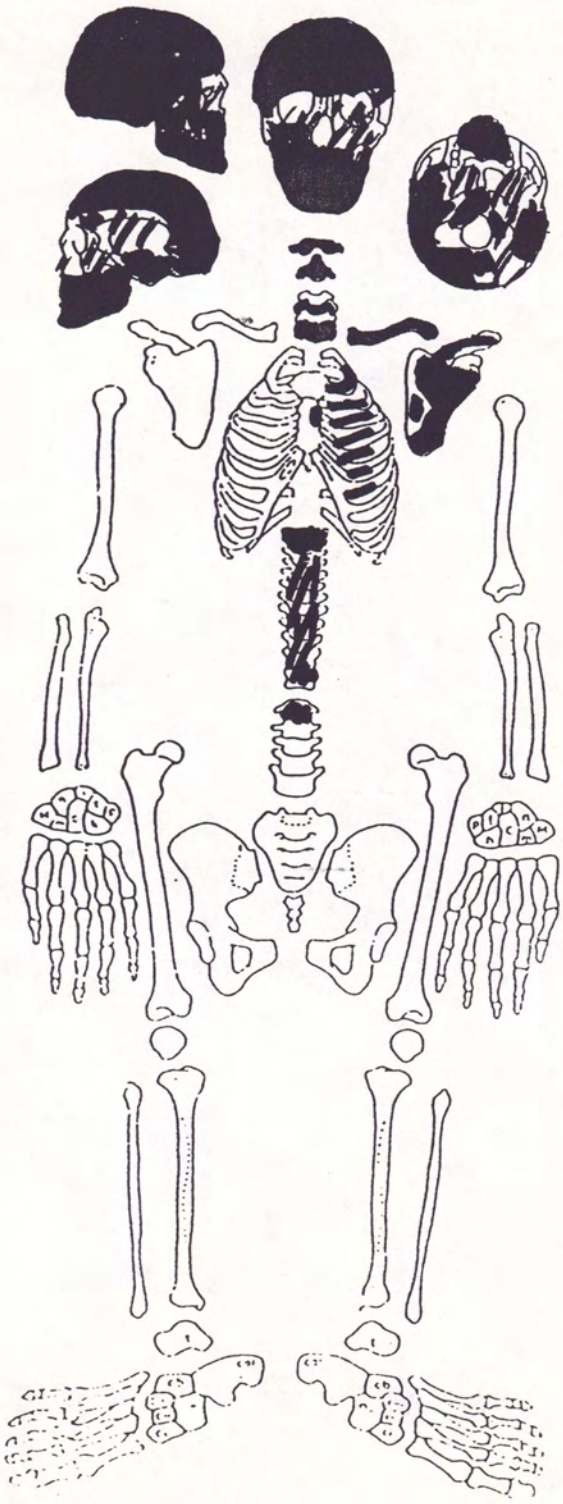


NIDARHOLM KLOSTERRUIN

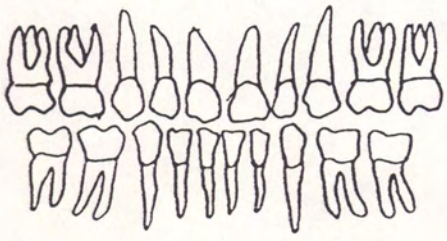
Utgravninger på Munkholmen 1988-1989

GRAV 3 Lag 44, N.112 199 OLFA 9/90

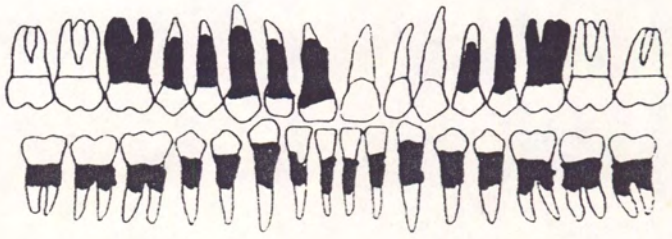
Kjønn: Mann Alder: 55-70 år



DECIDUOUS TEETH



PERMANENT TEETH



VEDLEGG III: TABELLER.

Tabell III-1: Kraniemål (i mm)

Kraniemål (M 1)	Grav 1	Grav 2	Grav 3
M 1 Max lengde	187	171	181
M 5 Nas.-bas. L.	-	95	-
M 8 Max bredde	145	141	148
M 9 Min. front. B.	96	95	-
M 11 Biauric. B.	123	130	-
M 17 Bas.-breg. H.	-	122	-
M 38 Kapasitet	-	-	-
M 23 Omkrets	524	-	-
M 25 Med.sag.arc.	-	342	-
M 26 Frontal arc.	123	126	-
M 27 Parietal arc.	128	111	126
M 28 Occipital arc.	-	105	-
M 29 Frontal chord.	112	111	-
M 30 Parietal chord.	114	103	114
M 31 Occipital chord.	-	85	-
M 40 Bas.-prealveol.	-	-	-
M 45 Bizygom. B.	-	-	-
M 48 Bimaxill. B.	-	-	-
M 66 Bigonial B.	104	-	106
M 47 Ansiktshøyde	-	-	-
M 48 Øvre ansiktsh.	-	-	-
M 54 Nesebredde	-	-	-
M 55 Nesehøyde	-	-	-
M 57 Min. B. neseben	-	-	-
M 50 Ant. Int.orb. B.	-	-	-
M 51 Orbital B. høyre	-	-	-
M 52 Orbital H. høyre	-	-	-
M 51 Orbital B. venstre	-	-	-
M 52 Orbital H. venstre	-	-	-
M 62 Palatal lengde	-	-	50
M 63 Palatal bredde	-	-	-
M 79 Mandib. vinkel	-	118	108
M 70 Mand.ram. H. høyre	68	-	73
M 71 Mand.ram. B. høyre	33	35	36
M 70 Mand.ram. H. venstr.	-	65	71
M 71 Mand.ram. B. venstr.	-	34	38
M8/M1	77.5	82.5	81.8
M17/M1	-	71.3	-
M47/M45	-	-	-
M48/M45	-	-	-
M52/M51 H	-	-	-
M52/M51 V	-	-	-
M54/M55	-	-	-

Tabell III-2: Humerus

M 1 Største lengde	H	350	325
	V	347	326
M 7 Min. omkrets	H	70	59
	V	66	-
M 5 Max.diam.midt.	H	24	21
	V	24	-
M 6 Min.diam.midt.	H	20	17
	V	19	-
M 4 Bicondyl.br.	H	66	59
	V	-	59
M7/M1	H	20.0	18.2
	V	19.0	-
M6/M5	H	83.3	81.0
	V	79.2	-

Tabell III-3: Radius

M 1 Max. lengde	H	263	245
	V	262	-
M 3 Min.omkrets	H	48	-
	V	46	-
M3/M1	H	18.3	-
	V	17.6	-

Tabell III-4: Ulna

M 1 Max.lengde	H	283	-
	V	279	-
M 3 Min.omkrets	H	39	-
	V	38	-
M3/M1	H	13.8	-
	V	13.6	-

Tabell III-5: Femur

M 1 Max.lengde	H		-
	V		-
M 2 Lengde	H		-
	V		-
M 8 Omkrets,midt	H		-
	V		-
M 9 Øvre transv.diam.	H		30
	V		29

M 10 Øvre sagitt.diam.H	27
V	27
M 21 Bicondyl.br.H	-
V	-
M 19 Transv.diam.caput H	44
V	44
M 20 Omkrets caput H	139
V	-
M 29 Collo-diaf.vinkel H	125
V	135
M 28 Torsjon H	-
V	-
M8/M2 H	-
V	-
M10/M9 H	90.0
V	93.1

Tabell III-6: Forekomst av nonmetriske trekk

Trekk	Trekk tilstede	Antall observasjoner
Sutura metopica	0	3
Ossic.sut.coronalis	0	3
Ossic.bregma	0	3
Ossic.sut.sagittalis	0	2
Ossic.lambda	0	3
Os Incae	0	3
Foramen parietale H	0	2
V	1	2
Oss.sut.lambdoid. H	0	1
V	0	2
Oss.asterion H	1	3
V	0	3
Oss.incis.pariet. H	0	3
V	0	3
Artic.frontotemp. H	0	3
V	0	2
Oss.pterion H	0	2
V	0	2
Mult.infraorb.foram. H	0	1
V	0	0
Foram.supraorbit. H	0	3
V	1	3
For.zygomat.facial. H	3	3
V	2	2
For.ovale incompl. H	0	2
V	0	2
Div.canal.hypogloss. H	0	3
V	1	3
Cond.occip.double H	1	3
V	0	3
Hüschkes foram. H	0	3

	V	0	3
Sin.sagitt.sup.	H	1	3
	V	2	3
Torus maxillaris	H	0	1
	V	0	1
Torus palatinus		0	3
Torus mandibularis	H	0	3
	V	0	3
Arc.mylohyoideus	H	0	3
	V	0	3
Mult.foram.mentale	H	0	3
	V	1	3
Sulc.N/A supraorb.	H	1	3
	V	1	3
Perf. humeri	H	0	2
	V	0	2
Sulc.preauricul.	H	0	1
	V	0	1
Sulc.supraacetabul.	H	0	1
	V	0	1
Impr.ligg.pub.dors.	H	0	1
	V	0	1
Canal.art.vert.atl.	H	2	3
	V	2	3
Tibial "squatt."fac.	H	0	0
	V	0	0

VEDLEGG IV: LISTE OVER LAGENES INNHOLD AV BEN.

Lag nr.	N.-nr.	Dyreben	Menneskeben		
			Kjønn	Alder	Minste antall
1	112 127	x	?	Inf. I	
			?	Voksen	
			M	Maturus	3
5	112 128	x	?	Voksen	
			?	Voksen	2
6	112 129	2412 gr	M	Maturus	
			?	Adultus	
			?	Juv el. Ad.	
	112 130	2228 gr	M	Voksen	
			?	Inf.II el. Juv	
			?	Voksen	
			?	Voksen	
	112 131	997 gr	M	Maturus	
			?	Maturus	
			?	Voksen	
			?	Voksen	4
8	112 132	148 gr	?	Voksen	1
9	112 133	713 gr	M	Maturus	
			?	Senilis	
			?	Adultus	3
11	112 134	390 gr	?	Voksen	1
14	112 135	46 gr	M	Voksen	1
15	112 136	3 gr	?	Voksen	1
16	112 137	293 gr	M	Voksen	1
17	112 138	159 gr	K?	Voksen	
			M?	Voksen	2
19	112 139	18 gr	?	Voksen	1
22	112 140	x	?	Voksen	1
24	112 141	x	ingen menneskeben		
25	112 142	46 gr	M	Adultus	
			?	Maturus	

	112 143	36 gr	?	Maturus	
	112 144	27 gr	K	Maturus	2
27	112 145	0 gr	K	Maturus	
	112 146	0 gr	M	Voksen	
			M	Voksen	
			M	Voksen	
			M	Voksen	
			K	Voksen	
	112 147	444 gr	?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
	112 148	105 gr	M	Voksen	
			K	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
			?	Voksen	
	112 149	1022 gr	M	Maturus	
			?	Adultus	
	112 150	535 gr	?	Maturus	
			?	Maturus	
			?	Maturus	
			?	Maturus	
			?	Adultus	
	112 151	1055 gr	M	Adultus	
			M	Mat/Sen	
			M	Adultus	
			K?	Voksen	
	112 152	717 gr	M?	Voksen	
			K?	Voksen	
			?	Voksen	8
28	112 153	54 gr	M	Voksen	
			K	Voksen	2
29	112 155	1574 gr	M	Voksen	
			?	Voksen	
31	112 156	227 gr	M	Maturus	
			?	Adultus	
			?	Juv/Ad	

			?	Inf.I/II	4
35	112 157	119 gr	?	Voksen	
			?	Inf.II el. Juv	
	112 158	411 gr	?	Inf II	
			?	Voksen	
			M	Maturus	3
37B	112 159	166 gr	?	Voksen	
			?	Voksen	
	112 160	28 gr	?	Voksen	
			?	Voksen	2
38	112 161	47 gr	K	Voksen	
	112 162	266 gr	?	Voksen	1
39	112 163	49 gr	?	Maturus	1
40	112 164	112 gr	ingen menneskeben		
43	112 165	144 gr	?	Maturus	
			?	Adultus	
			?	Inf.II/Juv	
	112 166	169 gr	?	Voksen	
	112 167	690 gr	?	Inf.II	
			M	Voksen	
			M	Voksen	
	112 168	0 gr	M	Juv (16-17 år)	
	112 169	12 gr	M	Ad/Mat	
	112 170	73 gr	?	Inf II (6 år)	
			K?	Voksen	
			M?	Voksen	7
45	112 171	1581 gr	?	Voksen	
			?	Juvenis	2
47	112 172	0 gr	K	Adultus	1
50	112 173	345 gr	?	Voksen	
	112 174	505 gr	?	Voksen	1
61	112 175	0 gr	M	Maturus	
	112 176	x	?	Voksen	1
69	112 177	x	?	Voksen	

	112 178	x	ingen menneskeben		1
71	112 179	x	?	Inf.II	
			?	Voksen	
	112 183	6 gr	K	Voksen	
			?	Inf.II	
	112 184	0 gr	K	Maturus	
	112 185	0 gr	K	Maturus	2
73	112 180	29 gr	?	Voksen	1
77	112 181	0 gr	?	Inf.II (6 år)	1
80	112 182	0 gr	?	Adultus	1

NOTER.

1. Martin, R. und K. Saller 1957 Lehrbuch der Anthropologie. 3rd ed. Gustav Fischer, Stuttgart.

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3. Ekroll, Øystein. 1989. Olavskyrkja. 8 fragment blir monument. Arkeologiske Undersøkelser i Trondheim nr. 3. Riksantikvaren, Utgravningskontoret for Trondheim.

4. Anderson, Trevor og Hans Göthberg. 1986. Olavskirkens kirkegård. Humanosteologiske analyse og faseinndeling. Fortiden i Trondheim bygrunn: Folkebibliotekstomten. Meddelelser nr. 2. Riksantikvaren, Utgravningskontoret for Trondheim.

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7. Trotter, Mildred and Goldine Gleser. 1952 Estimation of stature from long bones of American Whites and Negroes. Am. J. Phys. Anthrop. 10: 463-515.

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