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A BELL FOUNDRY IN SOLA CHURCH – BELL-CASTING AND COIN FINDS IN MEDIEVAL NORWAY

The focal point for the following discussion is an archaeological documented casting pit from a bell foundry inside Sola church. The stone church was built during the early part of the 12th century and remained in use until 1842. The casting event, which took place around 1400 or the decades just before and which then interrupted the liturgical function of the church, probably lasted no more than a few weeks or months, and the pit was back filled with casting debris once this activity had ceased. The casting pit was placed in the large opening connecting the nave and western tower of the church. The furnace used for the bronze melting probably was located in the western part of the nave, but due to digging in the 19th century, no traces of it were left when the archaeological excavation at Sola took place and the casting pit was found in 1986. Coins were found in the pit, and, since some bells from this period, in Scandinavia and Norway, have coins reliefs fixed to them, the question of whether the coins in the pit formed part of the casting process arises. Some of the coins may thus represent remains or losses of the casting process. The medieval bell used at Sola church, probably casted in the church, was abandoned in the 19th century.

However, the archaeological stratigraphy of the church and the casting pit, suggests that the coins excavated are *not* related to the casting process, but originally rather to earlier levels and then redeposited in the casting pit when it was back filled. Only one of the coins, a *hohlpfennig* from *ca* 1360–1380 is contemporary with the foundry while all the other coins are up to a hundred and fifty years older. Besides: 26 other coin-finds of similar ages, with an context to other parts of the church (chancel, nave and tower), show that coins were deposited in Sola church even before the bell casting took place and thus support the hypothesis that the coins found in the casting pit are redeposited.

1. Introduction

This paper discusses coin finds from a clearly defined moment in the history of a Norwegian medieval church. In 1986, during excavations of the ruins of Sola church in Rogaland (*Fig. 1*), the remains of a bell foundry were revealed inside the stone church (*Fig. 2*). The evidence consisted of a casting pit, filled with casting debris. The casting probably took place during a few weeks or months at the end of the 14th century or the beginning of the 15th century. The church was used as a place of worship for several hundred years both before and after this short disruption caused by the bell casting, maybe carried out in combination with a reparation of the church itself. This workshop represents one of two foundries identified archaeologically from medieval Norway.¹

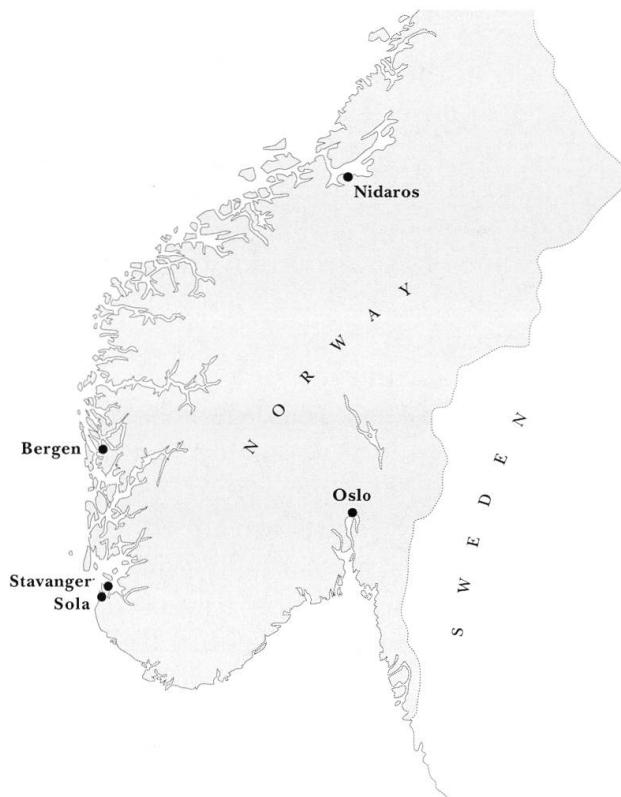
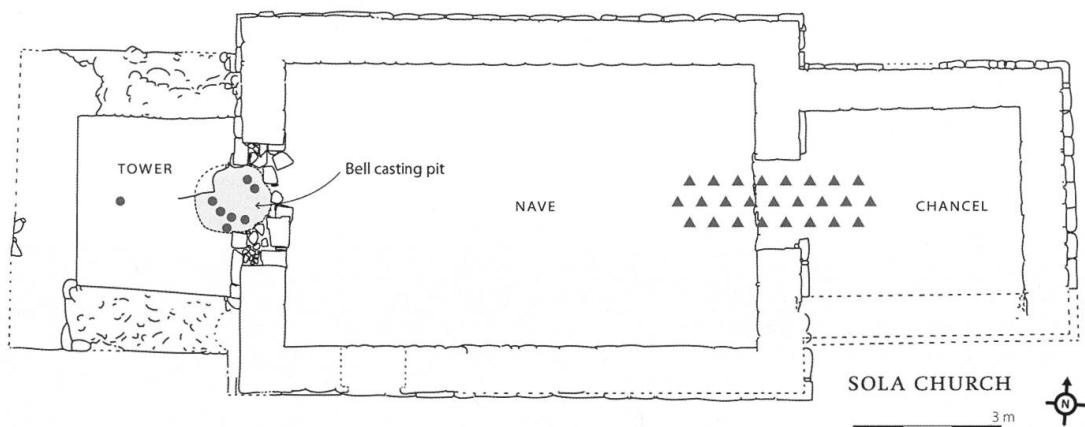


Fig. 1 The southern part of medieval Norway with some of her towns. Sola is located just outside the town of Stavanger in the south-western part of the country. Illustration: P. Bækken 2016.

The sealed bell foundry deposit contained a total of six, maybe seven, medieval coins, distributed within four of its stratigraphic layers (*Tab. 1* and *Fig. 3*). Here,

¹ The other foundry, from Trondheim (Nidaros, *Fig. 1*), was excavated in 2016 and is probably from the first part of the 15th century. It was located outside the populated area of the medieval town and not connected to a church. The author wishes to thank the archaeologist Julian Cadamarteri, Norwegian Institute for Cultural Heritage Research (NIKU), for this information.

the term «sealed deposit» refers to archaeological remains from a defined temporal context, which has been sealed and undisturbed until the archaeological investigation. The coins were thus part of a context which identified them to the bell-casting process. In addition, 26 other coins from other parts of the church are known (*Tab. 2*), one from the tower's area, also found in 1986, and a further 25 from the areas of the chancel and/or nave, found before 1865. This gives a total of 32 and possible 33 medieval coins from Sola church (*Fig. 2*).



- Medieval coins found in 1986. The locations are accurate.
- ▲ Medieval coins found prior to 1865. The locations are approximate, but the coins must have been found within the nave or chancel.

Fig. 2 The ground plan of the medieval church at Sola with the casting pit of the foundry marked. A later grave has disturbed the north-western part of the pit, which has therefore been marked by a dotted line (see *Fig. 8* below). The 25 coins found before 1865 and the 8 coins found in 1986 are also marked. Most of the southern chancel wall was removed by Bennetter, and this wall is therefore indicated by a dotted line.

Illustration: A. T. Hommedal 1986 and P. Bækken 2015.

After a general presentation of the history of the church, of the bell-casting deposit and of the technology of bell casting, two questions will be discussed. Firstly, were the coins used as part of the bell casting? As is known from some European medieval bells, also some Norwegian bells have coin reliefs fixed into the bells as decorations and liturgical markers. In the casting process it often was the coin reliefs that were incorporated into the clay form rather than the coins themselves. If this was the situation at Sola, that may explain why the coins still were present in the pit when excavated. The dating of the sealed bell foundry deposit and the coin finds, form part of this discussion. Secondly, how should the coins be interpreted if they were not related to the casting process? For both these questions, but especially the latter, a typological and temporal comparison with the coins found in other parts of the church must be carried out. In the methodological discussion, the relationship between primary and secondary place deposits is of importance.

1	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	S10295/II a 2
2	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	S10295/II a 6
3	Håkon IV Håkonsson (1217–1263)?	bracteate	1217–1263	S10295/II a 5
4	Magnus the Lawmender (1263–1280)	bracteate	1263–1280	S10295/II a 4
5	Duke Håkon Magnusson (1284–1299)	farthing	ca 1284–1299	S10295/II a 1
6	Norway	Hohlpfennig, a royal lion with a halo	ca 1360–1380	S10295/II a 7
7	Unidentified	Coin? (partly fragmented)		S10295/II a 3

Tab. 1 Sola church, Rogaland, Norway. Coins found in the bell casting pit in 1986. All coins have been identified by K. Skaare in 1986, except coin 6, which was re-identified by S. H. Gullbekk in 2015 and coin 7, which was re-identified by the same in 2020.²

Tower				
1	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	S10293/II a 1 ³
Nave/chancel				
2	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	SCHIVE VII, 57.
3	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	SCHIVE VII, 67.
4	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	SCHIVE XI, 38.
5	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	SCHIVE XI, 42.
6	Håkon IV Håkonsson (1217–1263)	bracteate	1217–1263	SCHIVE XI, 49.
7	Håkon IV Håkonsson (1217–1263)	bracteates	1217–1263	SCHIVE XI, 51.
8	Magnus the Lawmender (1263–1280)	bracteate	1263–1280	SCHIVE XII, 4.
9	Magnus the Lawmender (1263–1280)	bracteate	1263–1280	SCHIVE XII, 11.
10	Magnus the Lawmender (1263–1280)	bracteate	1263–1280	SCHIVE XII, 28.
11	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17; HOLST 1953, 17.
12	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17.
13	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17.
14	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17.
15	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17.
16	Eirik Magnusson (1280–1299)	penny	ca 1280–1285	SCHIVE IX, 17.
17	Duke Håkon Magnusson (1284–1299)	penny	1295–1299	SCHIVE X, 9.
18	Magnus Eriksson (1319–1355)	penny	1319–1355	SCHIVE XII, 60.
19	Magnus Eriksson (1319–1355)	penny	1319–1355	SCHIVE XII, 70.
20	Håkon VI Magnusson (1355–1380)	hohlpfennig	1355–1380	SCHIVE XII, 46.
21	Unknown issuer		late 14 th – early 15 th century	SCHIVE XIII, 8.
22	Unknown issuer		late 14 th – early 15 th century	SCHIVE XIII, 9.
23	Sweden, Albert of Mecklenburg (1363–1389)		1363–1389	SCHIVE XII, 54; HOLST 1946, 147.
24	Sweden, Albert of Mecklenburg (1363–1389)		1363–1389	SCHIVE XII, 55; HOLST 1946, 147.
25	Lübeck	bracteate	ca 1350–1400	SCHIVE [KAPITÄLCHEN] XIII, 12.
26	Lübeck	bracteate	ca 1400–1450	JESSE 1928, 186; HOLST 1953, 17.

Tab. 2 Sola church, Rogaland, Norway. The 26 coins found inside the church, but outside the bell-casting pit. The coin found in the tower in 1986 has been identified by K. Skaare in 1986. The other 25 coins, found before 1865 and most probably in the nave and/or chancel, were identified by C. I. Schive (1865), H. Holst (1953), and S. H. Gullbekk (2015).

² Number S 10295 (find from the bell casting phase), see HOMMEDAL 1994.

³ Number S 10293 (find from the church phase), see HOMMEDAL 1994.

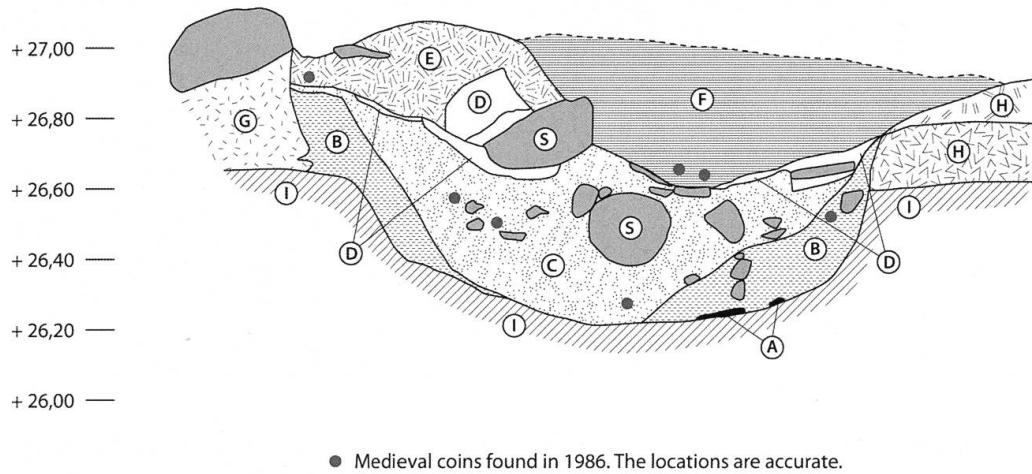


Fig. 3 Photo of a section through the half-excavated casting pit (top) and the section drawn showing the coin finds, both south-facing (i.e. the nave is to the left and the tower to the right). All the coins are projected onto the section at their correct elevation, even though they were actually found at varying distances from the section. The figure should be compared to (Fig. 2). Photograph: A. T. Hommedal/The Directorate of Cultural Heritage, 1986. Illustration: A. T. Hommedal 1986 and P. Bækken 2015.

2. From a 12th century medieval church to a late 20th century ruined church

The Romanesque stone church at Sola, built in the early part of the 12th century, had a rectangular nave and an almost square chancel. In the west there was a tower with an almost square foundation, which was built at the same time as the nave and chancel, as the stone foundations of the tower are connected to the stone foundations of the nave. The church had a southern portal in the nave, probably a western portal in the tower, as well as a southern portal in the chancel,

although no traces of the two latter are kept (Fig. 2). Originally the church seems to be erected as a private chapel, but for most of the Middle Ages Sola church was a parish church and it continued as such until 1842, when the building was disused and the roof removed (Fig. 4). In 1871 the ruined church was bought by the artist Johan Bennetter, who transformed it into a private house and an art studio (Fig. 5). In 1907 the building became a ruin once again and remained as such until 1940, when the walls were taken down to a height of *ca* 1.5 m. From 1982 to 1986 a building survey as well as an excavation was conducted, work which also included a partial reconstruction of the church walls based on original stones recovered from the site. Following an architecture competition, a new building, now called Sola ruinkyrkje – Sola «ruined church» (Fig. 6) – was constructed in 1993–1995, on top of both original and reconstructed walls.⁴

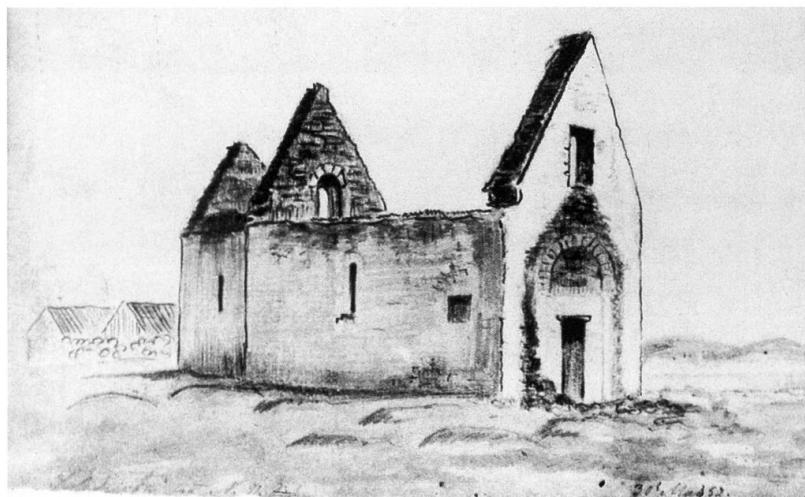


Fig. 4 Sola church seen from the north-west. The drawing shows the condition of the building after 1842 and then in the period when Customs Inspector C. I. Schive must have collected 25 medieval coins from the ruin. The tower has been torn down and the large opening connecting the nave and tower has been bricked up, leaving only a small door. In Schive's time the church no longer had visible remains of the tower. Since the cultural layers of the tower area were undisturbed until 1986, the coins Schive collected must be from the nave and/or the chancel and not the area of the tower. Drawing: B. Hansen 1852. The original is kept in the Stavanger Museum.

As a part of the preparations for the rebuilding, the area inside the church and parts of the churchyard were archaeologically investigated in 1986. It became clear that Bennetter in the 19th century not only made major alterations to the church building itself. As part of his remodelling Bennetter even removed all archaeological deposits in the chancel as well as most of the remains in the nave. This was also evident from the only coin find in the nave, a Norwegian 10-øring from 1894.⁵

⁴ HOMMEDAL 1999; HOMMEDAL – KLOSTER 1995.

⁵ Number S 10292, Coin 1 (find from Bennetter's house), HOMMEDAL 1994.

The tower of the church was torn down in the 17th century, but the lower part remained until 1801 when all but the stone foundations were removed. The large opening connecting the nave and tower was then bricked up and made into a smaller door (Fig. 4). As consequence, the tower was located outside Bennetter's house which meant that the archaeological deposits there, with the bell foundry remains, were not disturbed by Bennetter but left undisturbed until the archaeological excavations of 1986.

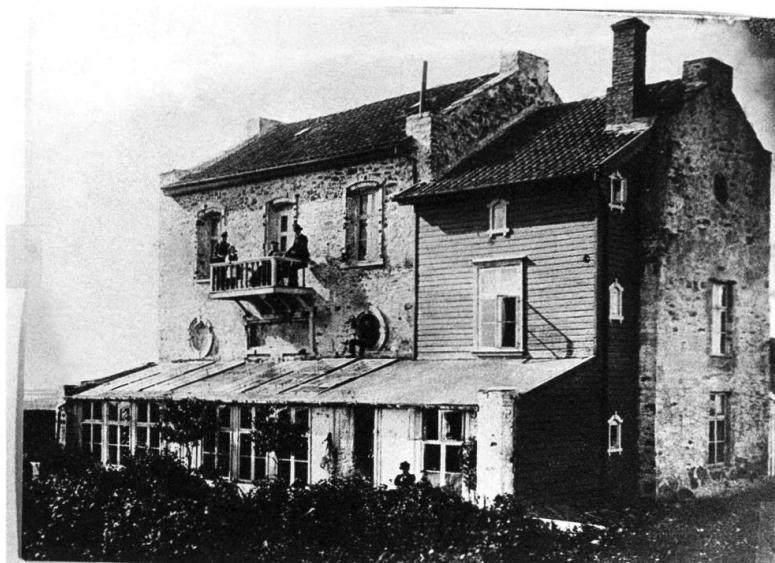


Fig. 5 Sola church as it appeared in 1880–1907, converted into a house and art studio for the Bennetter family. The building is seen from the south-east, with the chancel to the right and the nave to the left. Photograph: The Archives of the Directorate of Cultural Heritage.

3. The bell foundry

Shortly before the end of the 12th century the German monk *Theophilus* gave a brief description of the technique used for the casting of church bells, where he mentioned two main foundry parts: a casting-pit dug into the ground in which a burnt clay-mould of the bell was placed, and nearby on a slightly higher level, a melting furnace (Fig. 7). The two parts were connected by a tube or a duct which brought the molten bronze from the furnace to the mould.⁶ The casting-pit at Sola represents a foundry of this type (*cire perdue*). The melting furnace was probably placed in the westernmost part of the nave, but no traces were found during the archaeological excavation in 1986, which suggests that it was removed by Bennetter.⁷

⁶ FROSELL *et al.* 1986.

⁷ Another possibility is that the furnace was located outside the church, to the west of the tower, with the tube leading through the west portal towards the casting-pit. However, this seems less likely due to the distance that would give from furnace to pit.

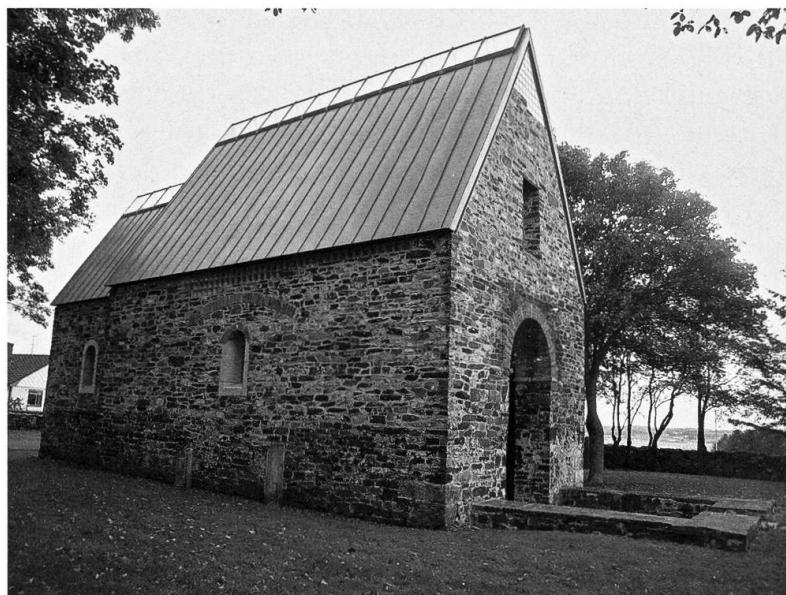


Fig. 6 The present Sola ruinkyrkje, seen from the north-west. This new building stands on the remaining walls (*ca* 1.5 m high) of the medieval chancel and nave. The outline of the tower (to the right) is marked by low walls. The casting pit from the bell foundry was situated halfway through the re-erected opening connecting the tower and nave.

This opening is now sealed by a glass wall. During the reconstruction of the church only original building stones from the medieval church were used. When these ran out, the walls were completed with glass blocks (see *e.g.* the western gable).

Photograph by the author 2004.

The oval casting pit had a diameter of 1.38–1.58 m and was 0.85 m deep. It was located in the tower area, but intruded halfway into the large opening connecting the tower and the nave, and the pit covered most of the area underneath the opening (Fig. 2 and 8). When the pit was dug, a part of the church's stone foundations, which continued underneath the opening, had to be removed. The pit was probably situated so that a lifting device could be attached to the upper part of the opening (Fig. 6).

By comparing the features at Sola and the information from *Theophilus* it is possible to form a general picture of how the casting process at Sola church was carried out: initially the bell maker created a full-sized wax model of the bell over a core of clay, which was then covered by a coat, or cope, of clay. At Sola both convex parts of the clay-core and concave parts of the cope have been found. When the mould was finished, it was burnt in order to harden and to melt away the wax, before being carefully lifted into the casting pit.⁸ The casting pit seems

⁸ From the early 14th century, bells were thrown standing vertically in the casting pits (VELLEV 1977, p. 232; LINDBERG – STIBÉUS 2009, p. 33). This cannot have been the case at Sola since no posthole for the throwing axle was found. The pit was moreover too small and awkwardly placed for the throwing to have taken place there, and the mould must therefore have been put in the pit after being created and burned elsewhere.

too small and situated too close to the church wall for the burning to have taken place here.⁹ Before the casting process, when hot liquid bronze was poured into the mould, the pit must have been filled with sand in order to stabilise the mould.

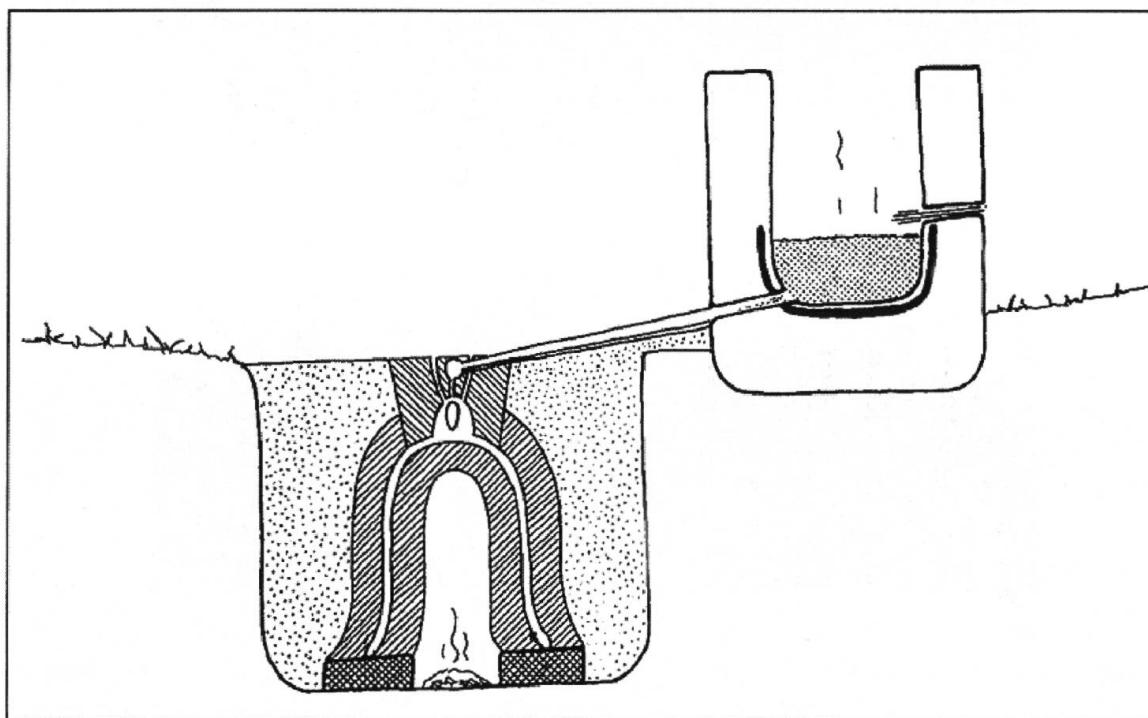


Fig. 7 A basic illustration of a bell foundry of the type described by Theophilus. The clay casting mould was created before it was placed in the pit. This should be compared to the find at Sola (Fig. 3).

After the casting process had been completed and the mould removed, the pit was back filled with soil and casting waste, such as the demolished clay mould, slag, waste metal, lime, charcoal and other things lying about in the church's area. Subsequently the disturbed part of the stone foundation of the church was

⁹ According to *Theophilus* (FROSELL *et al.* 1986, p. 294), a basin should be placed underneath the mould as it was being burnt, so that melting wax from the wax bell could be collected. If the mould was burnt in the pit at Sola this could explain why no wax remains were found during the excavations. However, the mould having been burnt elsewhere than the pit is also supported by the lack of intact charcoal layers and fire remains from such a burning process. At the very bottom of the pit there were small traces of charcoal (Fig. 3, A), interpreted as remains of charcoal which were attached to the mould and therefore transferred with the mould to the pit. If burnt in the pit, a charcoal layer may of course have been removed after the burning, and before the remainder of the casting process took place. However, as no traces of burnt soil were found at the bottom of the casting pit, this can be seen as a sign that no burning has taken place within the casting pit. Foundations, where the mould was resting, are often found in such casting pits but not at Sola.

reconstructed on top of the back filled pit. The excavations in 1986 found that the pit had been well-preserved except in the north-western corner, which had been destroyed by 17th century graves (Fig. 2 and 8).¹⁰



Fig. 8 The casting pit during excavation, seen from above and facing east (up), before sectioning (Fig. 3). The image shows how the pit has cut into the stone foundations of the church. Visible in the pit are burnt black and grey clay fragments of the broken clay mould, along with e.g. foundation stones that were replaced when the pit was filled up (see the ground plan in fig. 2). Photograph: K. A. Bergsvik/The Directorate of Cultural Heritage 1986.

If coin reliefs were added to the church bell at Sola, several different techniques may have been used. In the time of *Theophilus*, the coin design was normally pressed or carved into the clay cope. From the mid-14th century bell founders started to create wax models of inscriptions, pilgrim badges and other decorations which were to be reliefs on the bells, these were then attached to the wax mould of the bell. A third technique involved attaching coins directly onto the wax clock. During the casting, the coins then melted and became part of the bell¹¹. However, this technique seems not to be likely at Sola since the coins in question are preserved; otherwise, they would have melted.

¹⁰ SELLEVOLD – HOMMEDAL 2008, p. 80.

¹¹ ANDERSSON 1989, pp. 21–22.

4. The coins and the dating of the bell foundry

The bell-casting pit is dated by coins, pottery, radiocarbon dating, and thermoluminescence dating. The coins from the pit are presented in Table 1. They were documented contextually both laterally (x, y) and vertically (z). The youngest coin, a Norwegian *hohlpfennig* minted between *ca* 1360 and 1380 (Tab. 1, no. 6),¹² gives us a *terminus post quem* of 1360 for the casting process. The other dateable coins are older: two certain and one possible bracteate from the reign of Håkon Håkonsson, 1217–1263 (Tab. 1, no. 1–3), one bracteate from the reign of Magnus the Lawmender, 1263–1280 (Tab. 1, no. 4) and one farthing from the time of Duke Håkon Magnusson, *ca* 1284–1299 (Tab. 1, no. 5). In addition, there is a possible coin, which, if it is a coin, is difficult to date within the medieval period (Tab. 1, no. 7). Therefore, at least four, possibly five, of the six datable coins in the casting pit were struck in the 13th century, while only one dates from the 14th century. Six of these coins were found in stratigraphic layers relating to back filling after the casting process (Fig. 3, C–F).

Only one of the coins, preserved as two fragments and presumably minted in 1217–1263 (Tab. 1, no. 3), was found in the sand layer placed around the large mould before the casting (Fig. 3, B). This must therefore be the first coin to end up in the pit. Two of the coins (Tab. 1, nos. 1 and 5) were found in theoretically disturbed layers i.e. outside the sealed deposit (Fig. 2, F). Both coins were, however, vertically (z) documented at the very bottom of this layer, which clearly, judging by its contents, consists of later disturbed layers from the back fill of the bell pit. For this reason, these coins are interpreted as part of the sealed deposit. The exclusion of these two coins, however, would not change the results of the typology or dating of the coins in the pit (Tab. 1).

The coins from the casting pit cover a time period of almost 150 years, but it is the most recent coin which demonstrates that the casting process did not take place before the 1360s at its earliest. The thermoluminescence dating of a clay fragment from the mould provided a date of AD 1380 +/- 40 for the burning of the mould, which suggests that the bell casting took place during the second half of the 14th century or the first couple of decades of the 15th century.¹³ This corresponds to the minting of the *hohlpfennig* (Tab. 1, no. 6) with a possible minting and circulation period between *ca* 1360 and 1400, or maybe even longer¹⁴. This means that the *hohlpfennig* could very well have been in circulation at the time of the bell casting, which is much less likely for the older 13th century coins. A corresponding time span has also been established for three pottery fragments, which likewise were found in the bell pit. The two oldest fragments (Stamford and Andenne pottery, respectively) have both been dated to the late 12th or first half

¹² The *hohlpfennig* was originally dated to after *ca* 1320 (Number S 10295/II a 7, find from the bell casting pit), HOMMEDAL 1994. S. H. Gullbekk suggests a later date according to GOLABIEWSKIS 1983, pp. 112, 119, pl. XI: 2. The author wishes to thank the numismatists S. H. Gullbekk, J. CHR. Moesgaard and C. von Heijne for looking into the identification of this coin and thus to the *terminus post quem* of the bell casting at Sola.

¹³ MEJDAHL 1987; HOMMEDAL 1998; HOMMEDAL, forthcoming.

¹⁴ For the circulation periods of coins in general, see *e.g.* GULLBEKK 2011.

of the 13th century. The third fragment, of Yorkshire pottery, dates from the last decade of the 13th century or first half of the 14th century.¹⁵ In this case, the pottery dates correspond well with those of the coins. The youngest pottery fragment may only be some decades older than the minting time of the youngest coin, and thus still in use in the 1360s, while the other pottery sherds and the coins are over a hundred years older. There is hardly a direct connection between the pottery and the casting. The question in this case will be: how plausible is a connection between the coins and the casting, especially considering the large timespan between the youngest and oldest coins?

5. *The coins and the bell-casting process*

Church bells sometimes have inscriptions, *e.g.* the bell's name or the year it was cast. These inscriptions can also represent parts of liturgical prayers, such as *Ave Maria*. Alternatively, they contain information in Norwegian and/or Latin such as *Jon Biarnarson let gera mik. Jac. Jacobs me fecit* (Jon Bjarnesson had me made. Jakob Jakobsson made me).¹⁶ In this way we meet both the commissioning party and the bell founder. As mentioned above, bells can also have fixed imprints to them such as pilgrim badges and coins, which would have required the use of coins in the casting process.

In Denmark during the late Middle Ages it was relatively common to mark bells with a mark consisting of five coin-imprints forming the shape of the cross, often with a larger coin in the middle, emphasising the intersection of the crossbars. Such crosses were added by some specific bell casters and have been interpreted as the five wounds on the Body of Christ, *i.e.* the injuries inflicted by the nails through Christ's hands and feet and the lance in his side, which he received on Good Friday.¹⁷ Such representations of the wounds of Christ formed part of the Catholic liturgy for the Easter Vigil, where five grains of incense, representing the wounds, were inserted into the altar candle (in modern liturgy it is the Easter candle which is marked in this way). According to Uldall, coin crosses on church bells are rare in Germany and non-existent in *e.g.* Holland and Frisia.¹⁸ Bells with coin motifs exist also in Austria and Germany. In Denmark more than 70 such bells have been recorded, dating from the 14th century until the Reformation in the 1530s, and in Sweden around 40 such medieval bells are known.¹⁹ In Norway, only six medieval bells with coin motifs have been recorded.

¹⁵ HOMMEDAL 1994, pp. 65–66.

¹⁶ Selje church, Nordfjord. Unfortunately, the bell with this inscription was recast after it cracked in 1844, but the inscription was copied before the recasting, see CHRISTIE 1837, p. 55).

¹⁷ ULDALL 1906/1982, p. 220.

¹⁸ ULDALL 1906/1982, p. 220, note 1.

¹⁹ EKROLL – RISVAAG 2003, p. 51.

One of the Norwegian bells, from Alstadshaug church in Levanger, Trøndelag, has five bracteate imprints (15–20 mm in diameter) fashioned as a Greek cross, 10x10 cm.²⁰ Two of the bracteates have been identified as Swedish, minted in the 1350s and may have been in use until the beginning of the 15th century.²¹ In light of the dating of the coins it is likely that the Alstadshaug bell was cast in the second half of the 14th century or early 15th century, which would correspond to the time of the bell casting at Sola. It seems likely that coins used for the bell at Alstadshaug were still in circulation when the casting took place. Bø church in Telemark also has a bell with five coins placed in a sort of cross-shape. These coins can be dated to *ca* 1350–1520, that is within the same time frame as the bell casting at Sola, although with a relatively wide margin. Three Norwegian church-bells with one single coin imprint are also documented in Hof church in Vestfold, Norderhov church in Buskerud and Sauherad church in Telemark, as well as one bell with three conjoined coin imprints from Årdal church in Sogn.²² The dates of these coins are unknown, but the church bell at Norderhov is, however, dated to 1381–1419, i.e. the time of Bishop Sigurd of Hamar, who according to an inscription on the bell donated it to the church.²³ It is noteworthy that the bell from Norderhov, with its coin motifs, seems to have been cast at the same period as the bell at Sola.

The large bell from Fødstrup church on Zealand, Denmark is said to have been cast in 1525 with a cross-imprint. The largest coin (20 mm in diameter) located in the middle of the cross is a *sekspenning* from *ca* 1524, i.e. contemporary with the casting. The other coins in the cross imprint are four German bracteates,²⁴ of which at least three seem to be minted in Mecklenburg in the 15th century.²⁵

This overview suggests that coins still in circulation were generally used for the church bells, at least this was the case with the bells from Alstadshaug and Fødstrup. At Sola, it is therefore conceivable that the *hohlpennig* minted *ca* 1360–1380 was a part of a possible imprint on the bell's mould. The older coins at Sola, minted in the mid to late 13th century, on the other hand, would hardly still have been in circulation when the casting took place. It therefore seems implausible that all the coins from the casting pit were intended for the bell casting. It is more likely that, at the time of the casting, the coins were lying in the soil in the nave and/or in the area of the tower and then swept into the casting pit when it was back filled. This raises the question of how the dating of the coins from the casting pit compares to coins found in other parts of the church.

²⁰ Personal comment from S. H. Gullbekk in 2014, based on a letter of 23 April 1979 which included copies of photographs, Department Numismatics and Classical Archaeology, Museum of Cultural History, University of Oslo, see also EKROLL – RISVAAG 2003.

²¹ EKROLL – RISVAAG 2003, p. 51.

²² The author wishes to thank the art historian and campanologist T. de Groot for sharing his knowledge of these bells, and S. H. Gullbekk for dating the coins attached to the bell from Bø.

²³ CHRISTIE – CHRISTIE 1986, p. 145.

²⁴ Two of the four bracteates have a crowned bull motif. The motifs on the other two coins cannot be identified, ULDALL 1906/1982, pp. 219–220.

²⁵ ULDALL 1906/1982, pp. 219–220.

6. *The entire coin assemblage from Sola church*

The 26 medieval coins found outside the casting pit are presented in Table 2. The only medieval coin found outside the pit in 1986 was a Norwegian bracteate from 1217–1263 (*Tab. 2*, no. 1) which was found in the western part of the tower's area (*Fig. 2*). It is worth noting that the back fill from the casting pit contained two bracteates of the same type from 1217–1263 (*Tab. 1*, no. 1–2), which could strengthen the idea that these may also initially have been deposited in the tower or the nave. A third coin (*Tab. 1*, no. 3), which may have been of the same type, was, as mentioned above, found in the purer sand layer which would have been placed around the mould before the beginning of the casting process. It seems probable that also this coin was initially deposited in the tower base or the nave.

The remaining coins found earlier in Sola church, i.e. the 25 medieval coins found before 1865, present a challenge. A detailed investigation of the available documentation of these coins is therefore essential. These coins are today part of the coin collection of the University Museum in Bergen but were registered in the 19th century according to type rather than provenance, which means that it has been very difficult to identify the coins from Sola in the museum collection. The identifications of these coins are therefore based on earlier publications.

The coins are presented in C. I. Schive's catalogue of Norwegian medieval coins, *Norges Mynter i Middelalderen* from 1865. In this publication there are illustrations of 19 coins from «Sole Kirke, Jæderen» (Sola church, Jæren, *Fig. 10*).²⁶ According to H. Holst there are six specimen of Schive's pl. IX 17, which is a farthing from the time of Eirik Magnusson,²⁷ but only one was drawn by Schive, which adds a further five coins to the 19 (*Tab. 2*, no. 11–16).²⁸ Holst also added a German bracteate (*Tab. 2*, no. 26), which gives us a total of 25 (19+5+1) coins found before 1865.

The coins were most likely found at an otherwise unknown excavation in the 1840s, possibly related to the disuse of the church in 1842. The coins seem to be part of Schive's private coin collection, which he sold to Bergens Museum, i.e. the current University Museum of Bergen, in 1848–1849.²⁹ If the coins formed part of the collection sold by Schive (which I have not been able to check), they must have been removed from the church between 1842 and 1848–1849. At the very latest they must have been collected from the church before the publication of the coins in 1865.

²⁶ This applies to SCHIVE VIII 57 and 67; IX 17; X 9; XI 38, 42, 49, and 51; XII 4, 11, 28, 46, 54, 55, 60, and 70; XIII 8, 9, and 12. The references to «Sole kirke» as well as the weights of the individual coins are found in Schive's «Fortegnelse» (Index) of the individual posters.

²⁷ HOLST 1953, p. 17.

²⁸ The author wishes to thank A. Sættem at the Coin Cabinet of the Museum of Cultural History, University of Oslo, who drew attention to this detail mentioned in HOLST 1953. There the coins SCHIVE XII 54 and 55 or XIII 13, are not mentioned and therefore he only reached a total of 22 coins from Sola. HOLST 1946, p. 147, no. 56, however, mentioned these coins, but identified them as Swedish. An identification of 25 coins found before 1865 is thus dependent on whether Holst was right when he stated in 1953 that six *pennies* from the time of Eirik Magnusson were found, but that only one was depicted.

²⁹ SKAARE 1974, p. 4; SKAARE 1995, p. 313; SKAARE 2004.

It is likely that C. I. Schive himself collected the coins from the ruined Sola church (*Fig. 4*). Schive lived in Stavanger from 1840, where he worked as a Customs Inspector, but he was also one of the most central persons in Norwegian numismatic research in the period. We know from other sources that he had an interest in Sola church: Sometime after 1842 he collected two stone sarcophagi from the church and moved them to Stavanger.³⁰ It is even plausible that the stone sarcophagi and coins were collected on the same occasion.³¹ For Schive's research on medieval coins a new and more comprehensive coin material would have been of interest, and the then abandoned church at Sola supposedly was a good candidate for providing such a coin material. Any coins from the post-Reformation era were, if found, not documented in the same way as the medieval coins, perhaps because they were of less interest to Schive as they would not be included in his publication.³² None of the coins presumably found by Schive could have come from the tower's area or the bell pit, since the archaeological deposits in the tower footprint were intact in 1986. This strongly indicates that all the 25 coins presumably collected by Schive were found in the chancel and/or nave of Sola church.

Table 2 lists six of the 25 coins as bracteates from the reign of Håkon Håkonsson (1217–1263), three as bracteates from the reign of Magnus the Lawmender (1263–1280), six as pennies struck *ca* 1280–1285 in the name of Eirik Magnusson (1280–1299), and one penny from *ca* 1295–1299 in the name of Duke Håkon Magnusson (1284–1299). This means that 16 of the 25 coins, i.e. the majority, were minted in the 13th century. This corresponds with the coins from the bell pit, where four (possibly five) of the coins were minted in the 13th century. Two of the 25 coins from the chancel/nave were minted during the reign of Magnus Eriksson (1319–1355) and one from Håkon VI Magnusson (1355–1380), two are presumably Norwegian minted late 14th to early 15th century, two were Swedish coins from the reign of Albrecht of Mecklenburg *ca* 1363–1389. The two German coins are bracteates from Lübeck, minted *ca* 1350–1400 and *ca* 1400–1450. In comparison to the number of 13th century coins, there are relatively few coins from the 14th and 15th centuries.

³⁰ For many years the two stone sarcophagi from the church at Sola stood next to the tollbooth in Stavanger, and at least one seems to be registered at Bergens Museum in 1871 (see the article «Den gamle Solakirken er sannsynligvis fra Olav Tryggvassons tid» in the newspaper (avisa) Stavangeren, 31.07.1934. See also A. T. Hommedal, letter of 30.09.1989 to Historisk Museum, Bergen. Jnr. 186/1989 in the Universiy Museum of Bergen's Archive of letters). It is not impossible therefore that Schive carried out an excavation in the search for coins, when he collected the sarcophagi or on another occasion. Considering Schive's interest in medieval coins he must have known that there were coins in the church, and it can therefore be expected that the Customs Inspector investigated the ruined church for coins.

³¹ It would be natural to assume that the 25 coins were found when J. Bennetter worked on the foundations as he rebuilt the church in the 1870s, but the coins must have been found before this time, as the coins were published already in 1865 and Bennetter did not buy the ruin until 1871.

³² There has been no opportunity to check whether there are any post-Reformation coins in Shive's collection from Sola at the University Museum of Bergen.

In terms of dating and types the 25 coins from the chancel/nave (Fig. 10), and the single coin found 1986 in the tower's area (Fig. 9), correspond well with the six dateable medieval coins found in the bell-casting pit. Of these, five are from the 13th century and one from the 14th century (later than 1360, Tab. 1). Of the total 32 datable medieval coins from Sola church, no less than 22 are from the 13th century, six from the 14th century, three from the late 14th or early 15th century, and one from the first half of the 15th century, with the addition of another possible coin.³³ Norwegian coins are dominant with 26 of the 32/33 coins, and two possibly Norwegian, while the rest includes two Swedish, two German, and one unidentifiable. Around two thirds of the coins are from the 13th century (later than 1217). It is also noteworthy that no 12th century coins have been found, i.e. none from the first one hundred years that the church was in use.

It seems reasonable to believe that the coins found in the bell casting pit at Sola ended up in the church in the century prior to the establishment of the bell foundry. These coins represent a re-deposition into the pit. The only possible exception is the *hohlpfennig* (Tab. 1, no. 6) from *ca* 1360–80, which may represent a primary deposition and maybe a loss during the bell casting process.

This interpretation seemingly also corresponds to the other redeposited layers of the casting pit, which in addition to waste products from the foundry, contained waste from the construction of the church, such as lime and mortar, fragments of soapstone and wood residue. Some of this material may be from the demolished parts of the church's stone foundation when digging the bell pit, but some must also come from the original building process of the church. In addition, the redeposit fill contained a number of animal-bones, such as mouse skulls and a claw from a cat. These finds may also have been originally deposited in the soil in the nave and/or in the tower and then shovelled into the casting pit, together with the coins. This presupposes that the church did not have a wooden floor while it was used as a foundry, which seems obvious considering the risk of fire from the casting process.

The conclusion that the coins from the casting pit at Sola were not connected to the bell casting as such is supported by the lack of corresponding coin finds from other documented bell-casting foundries. At least 19 foundries for bell casting have been excavated in the Nordic countries.³⁴ In several cases no coins seem to have been found in relation to the foundries, such is the case in *e.g.* Visby³⁵, Vendel³⁶ and Skänninge.³⁷ In connection with the late 13th century foundry located close to the Dominican friary in Odense, five coins, from the 12th and 13th centuries, were found, but these were not interpreted as being directly related to the casting-process.³⁸

³³ The possible 33rd coin (S 10295/II a 3) is, as already mentioned, not clearly a coin even though the piece of metal must be medieval since found in the bell-casting pit.

³⁴ SKYLLBERG – ANUND 2003; LINDBERG – STIBÉUS 2009.

³⁵ SWANSTRÖM 1977.

³⁶ ANUND 1994–1998.

³⁷ LINDBERG – STIBÉUS 2009.

³⁸ VELLEV 1988, pp. 5 and 12–15.

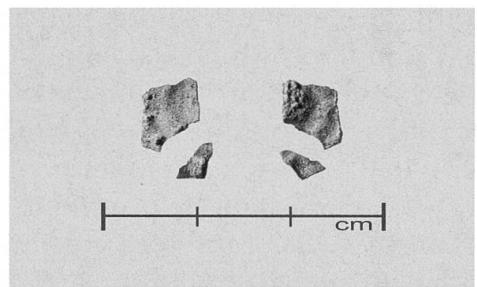
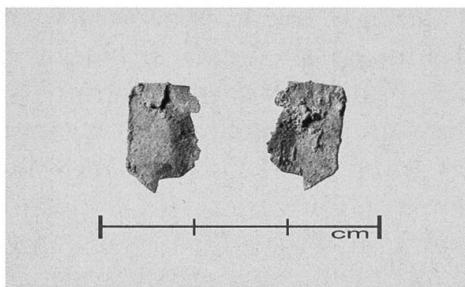
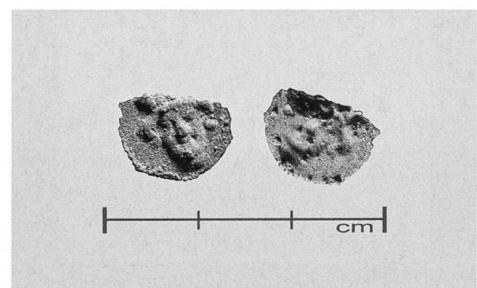
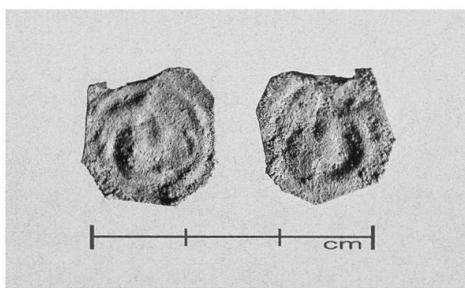
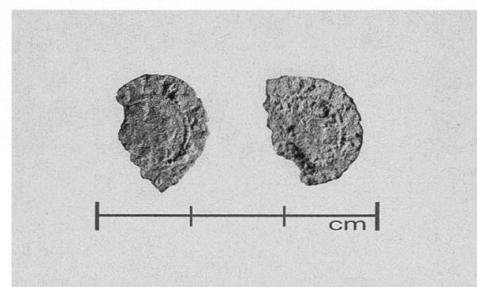
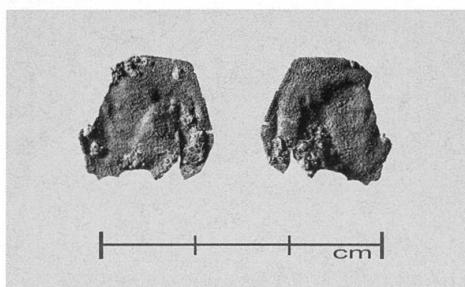


Fig. 9 Seven of the coins found at Sola church in 1986. The coin in the upper left corner was found in the tower base (a: S 10293/II a 1, see table 2.1), while the other six were found in the bell-casting pit (b–g: S 10295/II a 1, 2, 4, 5, 6 and 7, see table 1.1–6).
Photograph: Terje Tveit, The Museum of Archaeology, University of Stavanger.

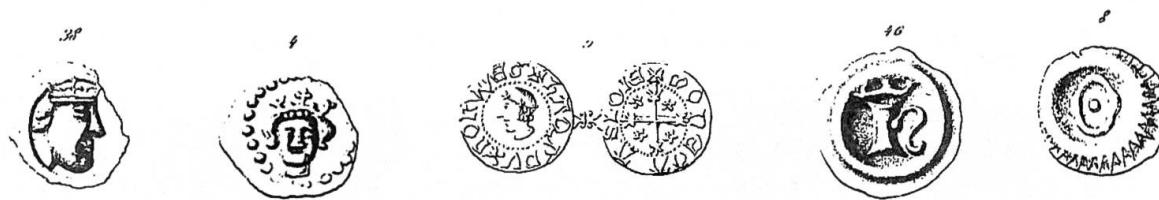


Fig. 10 Drawings of five of the coins (all Norwegian) found at Sola, from SCHIVE 1865. From the left: from the reign of Håkon Håkonsson, 1217–1263 (SCHIVE XI, 38); from the reign of Magnus the Lawmender, 1263–1280 (SCHIVE XII, 4); from the reign of Duke Håkon Magnusson, ca 1295–1299 (SCHIVE X, 9); from the reign of Håkon VI Magnusson, 1355–1380 (SCHIVE XII, 46) and from Unknown issuer, late 14th -early 15th century (SCHIVE XIII, 8).

7. Conclusions

The coins from the bell-casting pit at Sola seem to have been deposited there as a result of the foundry's location inside the church, but the coins do not seem to be directly related to the bell casting process. Since the church had already been in function for centuries before she was used as a casting workshop around AD 1400 or in the decades just before, coins must already have been present underneath the church floor, which is a common trait of Norwegian churches. The majority of the coins found in the archaeological context of the bell-casting foundry seem thus to be redeposited in the casting pit as it was filled up again after the casting process had taken place. However, one coin was redeposited with the sand filled in to stabilise the mould before the casting took place. Only the *hohlpfennig* minted ca 1360–1380 may represent a primary deposition and then most likely a loss or sacrifice during the back filling of the casting pit.

Abstract

The chapter interprets coin finds from a bell foundry's casting pit excavated in 1986 within a sealed archaeological context inside the 12th century Sola church, Norway. The bell casting, which took place around 1400 or in the decades just before, interrupted the liturgical function of the church for a few weeks or months. The key question to be explored is whether the seven coins retrieved from the foundry context derive from the casting process – which is a distinct possibility, since contemporaneous bells in Scandinavia occasionally have coin reliefs attached to them. The study concludes that only one of the seven coins is contemporary with the foundry, while the other coins are up to 150 years older. In addition, an assemblage of 26 coins was found in other parts of the church, all but one in the 19th century, and most of these are also older than the bell foundry. This shows that coins were being deposited in Sola church before any bell casting took place. The nature of the finds contexts in the church and casting pit therefore suggest that the coins found in connection with the foundry were not part of the casting process at all. Instead, they must derive from pre-foundry use of the church, being redeposited when the casting pit was back-filled once this rather unusual activity inside a church had ceased. This workshop represents one of two foundries identified archaeologically from medieval Norway.

Zusammenfassung

Um 1400 oder etwas davor, wurde in der aus dem 12. Jahrhundert stammenden Kirche von Sola, Norwegen eine Glocke gegossen, deren Gussgrube 1986 archäologisch dokumentiert und ausgegraben wurde. Der Gussvorgang unterbrach die liturgische Nutzung des Gebäudes für mehrere Wochen oder sogar Monate. Dabei stellt sich die Hauptfrage, ob die sieben in der Grube gefundenen Münzen vom Gussvorgang stammen, was nicht *a priori* auszuschliessen ist, da Münzen oftmals als Reliefelemente in mittelalterlichen Glocken verwendet wurden. Allerdings ist nur eine Münze aus der Zeit des Glockengusses stammt, die restlichen sechs sind gut 150 Jahre älter. Weitere 26 Münzen wurden (ausser einer) bereits im 19. Jahrhundert in anderen Teilen der Kirche gefunden; auch diese datieren noch vor den Glockenguss. Daraus kann geschlossen werden, dass in der Kirche von Sola Münzen verloren gingen oder gespendet wurden, bevor die Glocke gegossen wurde. Die Münzen aus der Gussgrube dürften also ihren Platz in der Grubenverfüllung erst beim Wiederzuschütten gefunden haben. Die Glockengrube in der Kirche von Sola ist eine von nur zwei archäologisch dokumentierten Glockengruben des mittelalterlichen Norwegen.

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Bibliography

ANDERSSON 1989 L. ANDERSSON, Pilgrimsräcken och vallfart. Medeltida pilgrimskultur i Skandinavien, Lund Studies in Medieval Archaeology 7. (Lund 1989).

ANUND 1994–1996 J. ANUND, Gjutanläggning för kyrkklocka i Vendel. Arkeologiska undersökningar 1994–96. Slutrapport, Arkeologiska Forskningslaboratoriet Stockholms universitet (Stockholm 1994–1998).

CHRISTIE 1837 W. F. K. CHRISTIE, Inscriptioner fra Middelalderen og de senere Tider, især i Bergens Stift, Urda, et norsk antiquarisk-historisk Tidsskrift vol. 2, no. 1, Bergen 1837, pp. 54–72.

CHRISTIE – CHRISTIE 1986 S. CHRISTIE – H. CHRISTIE, Norges kirker. Buskerud. Bind II (Oslo 1986).

EKROLL – RISVAAG 2003 Ø. EKROLL – J. A. RISVAAG, Pengeklang i klokkeklang, Spor, nytt fra fortiden, vol. 18, no. 2, 2003, pp. 2, 50–51.

FROSELL *et al.* 1986 P. H. FROSELL *et al.* (eds.) Theophilus: Klokkestøbning, Acta Campanologica 3, no. 10, 1986, pp. 289–301.

GOLABIEWSKI 1983 M. GOLABIEWSKI, Studie av 1300-talsbrakteater i ett depåfynd från Närke, Numismatiska meddelanden, vol. 34, 1983, pp. 105–122.

GULLBEKK 2011 S. H. GULLBEKK. Myntens omløphastighet i norsk middelalder: Middelalderens økonomiske system. Historisk Tidsskrift 90, 511–529.

HOLST 1946 H. HOLST, Svenske mynter og polletter i norske funn, nedlagt efter år 1100, Nordisk numismatisk årsskrift, 1946, pp. 137–153.

HOLST 1953 H. HOLST, Numismatiske kirkefunn i Norge. Mynter fra 12. århundre til nyere tid, funnet i norske kirker og kirketufter, Nordisk numismatisk årsskrift, 1953, pp. 1–31.

HOMMEDAL 1994 A. T. HOMMEDAL, S10292/ S10293/ S10295. Funn fra marinemalar Johan Bennetters hus/kyrkjefasa/ klokkestøypingsgropa, Sola kyrkjeruin, Sola, gnr. 14, bnr. 34, Sola, flyfoto/reg.nr. 9360 C4 R10, fornminnenr. R 11240014003, Samlingens tilvekst 1994. AmS-Tilvekst 4 (1994), pp. 44–48, 62–67.

HOMMEDAL 1998 A. T. HOMMEDAL, Eit klokkestøypingsanlegg frå mello-malderen på Sola, Frá haug ok heiðni 2, 1998, pp. 3–10.

HOMMEDAL 1999 A. T. HOMMEDAL, Frå Sola kyrkjeruin til Sola ruinkyrkje. Antikvariske problem og løysingar i arbeidet med ein mellomalderruin, Årbok, Foreningen til norske Fortidsminnesmerkers Bevaring vol. 153, (Oslo 1999), pp. 115–140.

HOMMEDAL, forthcoming A. T. HOMMEDAL, Bell Casting and Bell Casters in Medieval Norway (forthcoming).

HOMMEDAL – KLOSTER 1995 A. T. HOMMEDAL – L. KLOSTER, Sola ruinkyrkje. Mellomalderkyrkje – kunstnarbustad – kyrkjeruin – ruinkyrkje (Sola 1995).

JENSEN 1985 J. S. JENSEN, Møntaftryk på kirkeklokker, Klokker, Arv og Eje, Dansk Kulturhistorisk Museumsforening 1983/84 (Viborg 1985), pp. 129–140.

JESSE 1928 W. JESSE, Der wendische Münzverein (Lübeck 1928).

KJELLBERG – STIGUM 1936 R. KJELLBERG – H. STIGUM, Det norske håndverks historie fra senmiddelalderen til nyere tid (Oslo 1936).

LINDBERG – STIBÉUS 2009 S. LINDBERG – M. STIBÉUS, Dyhagen, UV ÖST RAPPORT 2009:4. Arkeologisk undersøkning – Skäningeprojektet, Riksantikvarieämbetet Avdeling för arkeologiska undersökningar 2009:4, pp. 1–72.

MEJDAHL 1987 V. MEJDAHL, A Survey of Archaeological Samples Dated in 1986. The Nordic Laboratory for Thermoluminescence Dating. Risø National Laboratory, 4000 Roskilde, Denmark. October 1987.

SCHIVE 1865 C. I. SCHIVE, Norges Mynter i Middelalderen (Christiania 1865).

SELLEVOLD – HOMMEDAL 2008 B. J. SELLEVOLD – A. T. HOMMEDAL, Archaeological Bones – The Anatomy of an Abandoned Churchyard, Norwegian Archaeological Review 41–1, 2008, pp. 71–84.

SKYLLBERG – ANUND 2003 E. SKYLLBERG – J. ANUND, I feudala och urbana kontexter; metallhantering ca 1000–1600 e. Kr., in: L. BERG – H. FORSHELL – A. SÖDERBERG (eds.), I gruva och grav. Metallhantering från bronsålder till nyare tid. (Stockholm 2003), pp. 17–29.

SKAARE 1974	K. SKAARE, Litt om Schives Verk og Tilblivelse. Inledning til nyopptrykk av Schive 1865 (Aalborg 1974).
SKAARE 1995	K. SKAARE, Norges Mynthistorie, Bind 1–2 (Oslo 1995).
SKAARE 2004	K. SKAARE, Schive, Claudius, Norsk biografisk leksikon, vol. 8, Oslo 2009, pp. 77–78.
SWANSTRÖM 1977	E. SWANSTRÖM, Gjutplats för kyrkklocka i Visby, Hikuin vol. 3, 1977, pp. 223–230.
VELLEV 1977	J. VELLEV, Støbning af middelalderens kirkeklokker, Hikuin vol. 3, 1977, pp. 231–256.
VELLEV 1988	J. VELLEV, Et middelalderligt bronzestøberi i Odense og noget om middelalderens klokker og gryder (Højbjerg, 1988).
ULDALL 1906/1982	F. ULDALL, Danmarks Middelalderlige Kirkeklokker (København 1906/Højbjerg 1982).