

Tile fragments from St Fillan's Church, Forgan, Fife

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CIRCUMSTANCES OF THE FIND

The discovery at St Fillan's church, Forgan (NO 446259) in June 1971 of 119 fragments of medieval flooring tiles is of value for the quantitative contribution it makes to the relatively slender corpus of material available in this field (Richardson 1929, 284 ff). The majority of the pieces were found at varying depths of 30 cm–60 cm immediately outside the S side of the chancel wall, lying haphazardly in the loose, sandy soil and intermingled with piles of stone slates.¹ All the tile samples recovered had been deliberately broken prior to being lifted from their original position. Subsequent examination of the fabric of the now ruined building revealed that a number of pieces had been used as pinning in the whinstone N and S walls of the chancel and in the W gable.

Proceeding on the assumption that the medieval chancel had possibly been paved with these tiles, a trench was sunk extending inwards for a distance of two metres from the S wall. A floor level was suggested by the presence of a late sixteenth-century recumbent grave slab 23 cm below the present surface. It became apparent, however, that a large amount of rubble had fallen in from the surrounding walling, or had been laid on an earlier level for 69 cm below that of the slab. The investigation disclosed at this point an irregular line of ten random fragments resting on the subsoil. The absence of a more substantial bedding considered in conjunction with traces of mortar on a number of fragments would indicate that these latter pieces were not *in situ*, but had been disturbed from a level that has not yet been determined. A shaft sunk centrally in the chancel failed to reveal any sign of tiled flooring material at the same depth, while further excavation at the extreme E end of the chancel was prevented by three nineteenth-century burials.

DESCRIPTION

Definitive measurement of the tiles is prejudiced by their fragmentary nature, but from two pieces that could be partially fitted together, as well as from sections that included two right-angle corners, dimensions of 12.2 cm by 13.5 cm by 2 cm are common.² Where it could be ascertained, the sides of the tiles slope inwards from the top surface at angles ranging from 75° to 85°, a measure taken to ensure strong bonding with the mortar bed and allow for neat jointing. Tonal variations of red occur ranging from light red, in the majority of pieces, to brownish red. Thirty-five pieces still show substantial evidence of glazing. While residual traces on the surface or sides of others suggest that all were at some stage glazed, this consideration would have to be balanced against the obvious lack of wear on some of the unglazed fragments. The glazings applied are: light-green (3), mottled green and black (7), black (10), cream (11) and cream and brown (2). Although red clay by itself is not aesthetically a particularly suitable

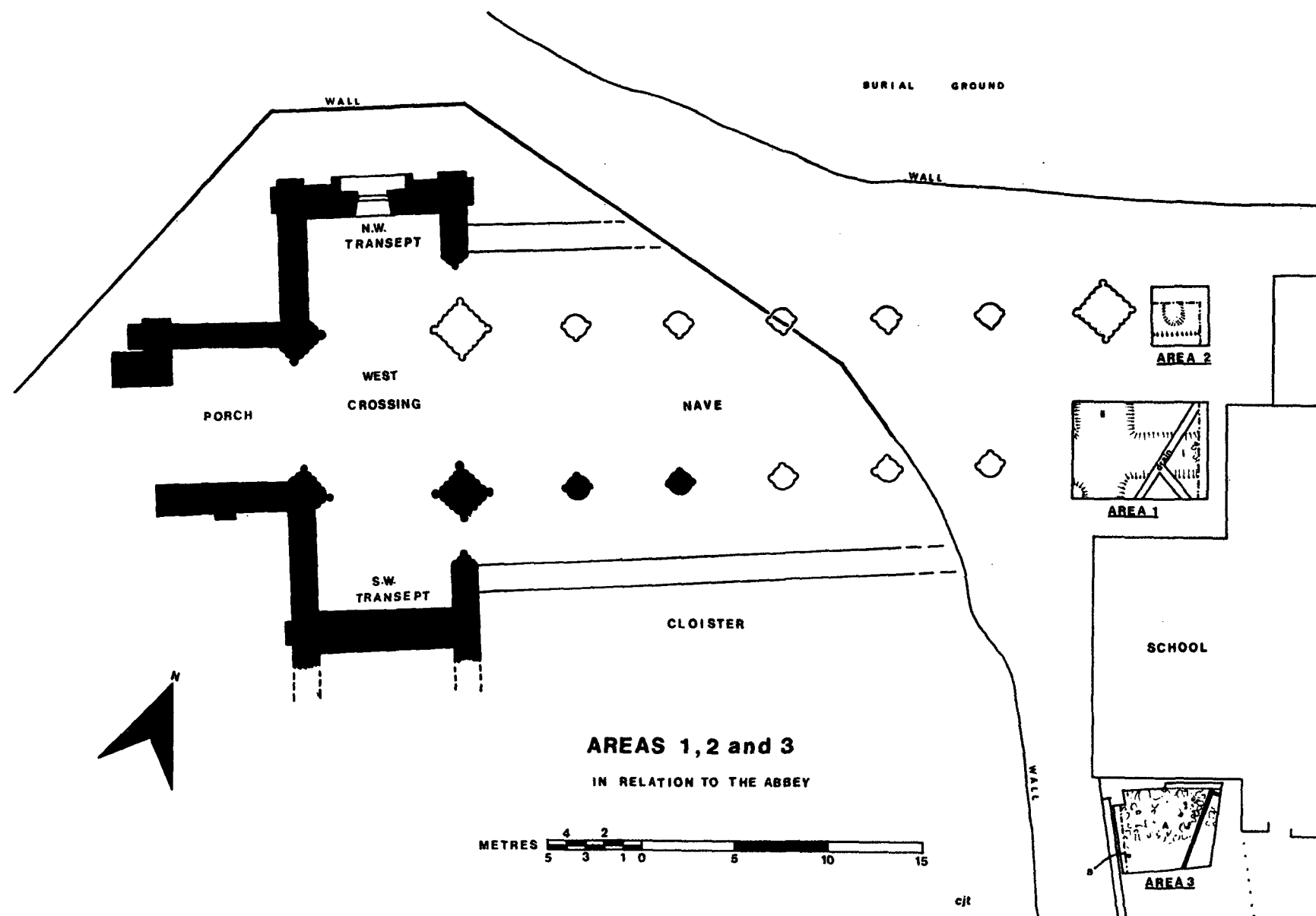


FIG 2 Kelso Abbey excavations 1971, Areas 1-3

ground for green or cream (Berendsen 1967, 250), the mottled green has been applied directly and thinly on to the tile surface, but in the case of the light greens and creams, a slip has been used. Apart from this, no other surface decoration has been utilised either in the form of inlaid or embossed patterns (Richardson 1929, 299, 301, 305).

Mortar adhesion is restricted to the undersurfaces and sides of 21 fragments, the rest being noticeably clean, a factor that may be explained by the tendency of tiling to spring up free from its bedding when subjected to impact. The undersurfaces of all the tiles show clear indications of having been placed in a sand lined tray prior to firing. A considerable number of the fragments have contained pieces of straw.

DISCUSSION AND COMPARISON

Since it would appear from a number of similar tiles deposited with the National Museum of Antiquities that finds of this nature have tended to originate from major ecclesiastical establishments,³ one is justified in attaching special significance to the location of the tiles at St Fillan's in that they represent the largest number of recorded examples from a pre-Reformation parish church in Scotland.⁴ In view of the connections existing between St Andrews Cathedral and St Fillan's, it is possible (a) to establish an interrelationship between the tiles found at the latter and the tile bed which was discovered *in situ* in the choir of the former by Dr Hay Fleming during an excavation carried out in 1903 (Fleming 1904; Hutcheson 1888) and which, despite variations in size and thickness, bears close compositional similarities to those from St Fillan's; (b) to explain the presence of the St Fillan's tiles and (c) suggest an encompassing date for them.

It is known that the church of St Fillan was granted to the priory of St Andrews by David I c 1150 and that, although corporal possession had not been obtained by 1259, it was effected shortly afterwards. In 1292 the perpetual vicarage was annexed to the priory by Bishop William Fraser, the cure thereafter being a vicarage pensionary (Cowan 1967). These events carry with them the twofold implication of, firstly, the existence of a structure that certainly predates most of the remaining ruin with the exception of window details retained in the E gable, and secondly, within the context of canon law, the duty of keeping in repair that part of the church of St Fillan which consisted of the chancel or choir (Duncan 1864, 134). From the fulfilment of this responsibility one can go on to postulate that actual physical maintenance was probably in the hands of the Master of Works at the Cathedral who, if he were in charge of the tile laying in the choir there, could have extended the scope of his work to include covering the same floor area at St Fillan's.

Since it has been shown (Richardson 1929) from evidence accumulated at the Cistercian monasteries at Melrose, Newbattle, North Berwick and Glenluce that tiles from Scottish ecclesiastical buildings nearly all belong to the thirteenth century, it is likely that the laying of either the St Fillan's or Cathedral samples could be ascribed to this century, especially when the assertion would fit into the pattern of initial structural completion of both buildings and at the same time coincide with the period of the annexation of the parish church.

ACKNOWLEDGMENTS

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J di F

ANALYSIS OF TILE FRAGMENTS FROM ST FILLAN'S CHURCH, FORGAN, AND ST ANDREWS CATHEDRAL

The red tile fragments obtained from both sources were similar in general appearance. The St Fillan's fragments were, however, softer in texture and their colour tended to be a little paler and of a brownish-red hue. Iron analysis, dehydration studies, infra-red spectral measurements, thermogravimetric analysis and differential thermal analysis were performed on finely ground samples of the fragments using standard techniques and equipment.

RESULTS AND INTERPRETATION

Infra-red Spectra. Measurements were made using a Perkin Elmer 621 Infra-Red Spectrophotometer, and the samples were examined as Nujol mulls held between potassium bromide plates.

The spectra of both specimens were almost identical and each showed peaks centred at the following frequencies (cm^{-1}):

St Fillan's sample: 3400 w, b; 1610 w; 1080 s, b; 795 m; 780 m; 720 w; 690 w

Cathedral sample: 3380 vw, b; 1610 vw; 1080 s, b; 800 m; 780 m; 720 w; 695 w

(vw = very weak; w = weak; m = medium; s = strong; b = broad)

The only difference of significance in the infra-red spectra of the two samples lay in the relative intensities of the peaks at 3400 cm^{-1} and 1610 cm^{-1} ; the St Fillan's sample gave peaks of greater intensity at these frequencies.

The occurrence of peaks at these frequencies points to the presence of water in the samples, and the greater intensity of these peaks for the St Fillan's sample indicates a higher water content. It is significant that samples which had been previously heated to 1000° had no peaks in their infra-red spectra at these frequencies. The other peaks present in the spectra arise from the aluminosilicate framework of the tile material and this is the same for each.

Dehydration Studies. Prolonged heating of samples of the tiles, until constant weight, gave the following values of percentage weight loss.

	St Fillan's sample	Cathedral sample
Heating to 80°C	0.55%	0.01%
Heating to 1000°C	2.63%	1.40%

Percentage weight losses on heating to 1000° can be taken to represent the total water content of the samples. The figures confirm the findings of the infra-red study and the values for heating to 80°C suggest that in the St Fillan's sample much of the water present is fairly loosely bound. A full thermogravimetric analysis of the samples was therefore thought to be desirable.

Thermogravimetric Analysis. A Stanton Thermobalance (Model TR-1) was used in these studies. Samples were heated, in an atmosphere of air, from room temperature, to 900°C , using a heating rate of 1° per minute, during which the sample weight was continuously recorded.

Cathedral sample—the thermogram indicates that dehydration begins at about 160°C and is complete at 680°C . Between these two temperatures water loss occurs slowly and uniformly.

St Fillan's sample—dehydration commences at a lower temperature, 35°C, in this case and is complete at 480°C. At first the rate of water loss is relatively rapid, but from 84°C upward a slower rate of loss is observed. About one fifth of the water content of the sample is lost below 80°C.

For each sample, dehydration is a continuous process and there are no plateaux in the weight traces.

Differential Thermal Analysis (DTA). These were performed on the DTA attachment (STA 662) to the thermobalance, and a heating rate of 4° per minute was used.

No peaks were found in the DTA trace of the Cathedral sample. The St Fillan's sample on the other hand gave a trace containing one broad symmetrical endothermic peak commencing at 20°C and centred at 80°C. This endotherm is clearly attributable to the initial relatively rapid loss of loosely bound water from the sample (as observed in the thermogravimetric analysis). The absence of peaks in this trace at higher temperatures and the complete absence of peaks in the Cathedral sample trace is presumably due to the very slow rate of dehydration.

Iron Analysis. The tile fragments were decomposed by fusion with sodium hydroxide and their iron content subsequently determined colorimetrically (thiocyanate method). The results are as follows: Cathedral tile, 3.18% iron; St Fillan's tile, 3.01% iron. There is therefore only a small difference in iron content of the samples. This is partially attributable to the fact that the St Fillan's sample has a higher water content but making allowance for this in calculating the results indicates a still slightly higher percentage for the Cathedral sample (3.23% as opposed to 3.09%).

CONCLUSIONS

The above evidence suggests a fairly close similarity in nature and composition of the tile fragments from the two sources. The main difference is the greater degree of hydration of the St Fillan's sample and the more loosely bound nature of its water content. This difference is perhaps to be expected since the St Fillan's fragments, unlike those from St Andrews Cathedral, were found under soil exposed to the weather. They would therefore be subject to the weathering action of ground water which would cause slight decomposition of the aluminosilicate structure of the tile material giving a more readily hydrated product.

Other minor property differences between the St Fillan's and the Cathedral specimens accord with this interpretation; for example, the more friable nature of the St Fillan's tile and the banded appearance of a freshly broken sample of it. Also, the brownish tint of the St Fillan's samples is indicative of hydrated ferric oxide (ferric oxide is the colourant of red tiles). A further possible action of ground water (depending on its acidity) is the leaching of iron from the tile. The slightly lower iron content of the St Fillan's tile may be due to this.

It would seem that, taking account of the difference in exposure to weathering of the St Fillan's and Cathedral tile fragments, and the effect this would have on their properties, these tiles were very probably closely similar, if not identical, originally.

G S H

NOTES

- 1 Forgan Kirk Session Minutes contain an entry for 24th April 1699, referring to the purchase of 2500 slates and roofing timber.
- 2 The thickness varied from 1.7 cm to 3 cm.

- 3 National Museum samples were inspected – NMAS cat nos LR 5, LR 6, LR 39, LR 80 from Dunfermline and St Andrews Cathedral. Attention is also drawn to the sites mentioned in Richardson 1929.
- 4 Tile finds are recorded for collegiate churches as in Wilson 1862 and RCAMS 1933, 227.

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