

# Kellie Castle

*Fife*

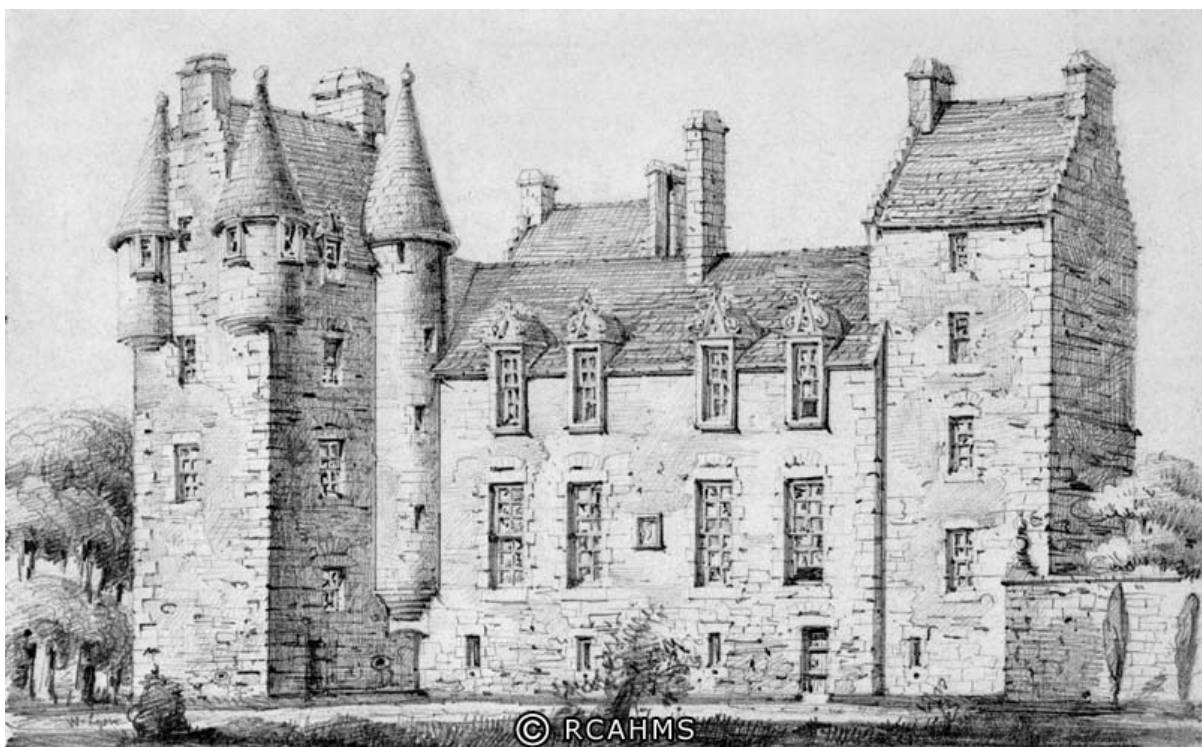
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*Library Ceiling: investigation of floor structure holding up early 17<sup>th</sup> century plaster ceiling*

*for*

The National Trust for Scotland

*February 2019*



*Kellie Castle*

## Addyman Archaeology

Archaeology   Heritage Consultancy   Architecture

## Addyman Archaeology

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### *Library Ceiling: investigation of floor structure holding up early 17<sup>th</sup> century plaster ceiling*

by Kenneth Macfadyen

#### *1. Introduction*

##### *i. General*

Addyman Archaeology were commissioned by the National Trust for Scotland (contacts, Gillian Murray, NTS and Steve Wood, David Narro Associates) to investigate the below floor structure of *bedroom 35* of Kellie Castle, near Anstruther in Fife.

The early 17<sup>th</sup> century decorative plaster ceiling on the ceiling of the library room below (*room 25*) shows serious historic distortions along one wall as well as general slumping across the ceiling. The plaster of the ceiling may be showing fresh cracking suggesting new movement.

The project was intended to investigate and make an archaeological survey record of the floor structure supporting this plaster ceiling. A number of floor boards above the ceiling were lifted to allow some access to the below floor space. The recording included a drawn survey of the floor structure as well as a photographic record of the floor joists, with basic notes on each joist showing details of how the ceiling is attached to the joists and how the joists relate to one another.

The archaeological survey record was intended to inform structural designs for supporting the floor and plaster ceiling below.

The recording was undertaken by Kenneth Macfadyen on the 25<sup>th</sup> of February 2019.

##### *ii. Methodology*

Four areas of floorboards were lifted to allow good access into the floor void, two boards were lifted along the window wall to allow some access to all the joists and two further areas of boards were lifted in front of the fireplace where most of the distortion below occurs.

A plan of the exposed joists was drawn at 1:20 as well as a section across the room showing all the joists. Each main joist was given a context number, in the following text context numbers are given in *italics*; these are cross-referenced to photographs.



Figure 1 Site location

## 2. Record

### i. General

The decorative plaster ceiling of the library (*room 25*) is dated 1617 and is of historical importance; part of this ceiling directly above the fireplace had locally dropped considerably, but historically. It was suggested that cracking associated with the distorted ceiling had recently extended and there was concern that the ceiling and structure above was failing (*plate 1*).

Some floorboards were previously lifted in the bedroom (*room 35*) above to investigate and some large shakes were noted in the early timbers of the floor structure. It was also noted that the plaster ceiling in this area in front of the fireplace had in recent history been bolted up into the floor timbers, presumably in a historic but fairly modern attempt to provide support to the plaster ceiling. The ends of the bolts within the plaster below were located by magnets by the client.

### ii. Results

Within the floor board lifting each joist was at least in part exposed allowing some investigation of each. A basic description and measurements were taken and photographs taken along the joists below the floor. Due to the irregularity along the length of the joists the measurements are approximate. All joists ran NNW-SSE but are described in the text as running N-S for ease of description (*figure 2*).



Figure 2 plan and section of exposed timbers overlain onto supplied plan



Following the investigations the structure was believed to be of one or two phases, the first phase comprising a series of widely spaced large joist floor structure followed by the flooring and ceiling of 1617.



*Plate 1 early 17th C plaster ceiling of library slumping above fireplace (photo 01)*

*a) Joist No 01*

This joist was a 0.11m wide and 0.14m high squared beam likely running from the south elevation to the fireplace side. The plaster ceiling below appears to be nailed onto the underside of this beam and the upper side is levelled for the flooring with a thin reused plank nailed on to level.

*b) Joist No 02*

This joist was a 0.10m wide and 0.07m high ¼ caber still with some bark on waney edges. It sits directly below and supports the floor. Beneath this is *Joist 3* with a large gap in-between, a couple of large nails join the two at the south end but the majority of the beams are unconnected (*plate 2*).



*Plate 2 joist 2 and 3 to right, 2 at top 3 at bottom showing gap between and bolt from below, joist 15 to left looking south, note sloping of plaster below (photo 22)*

*c) Joist No 03*

A 0.10 x 0.10m squared beam with waney edges and some light shakes, this beam appears to be located along the line of the main drop in the ceiling below. The plaster ceiling below appears to be attached to the underside of this beam. A number of threaded bolts run through the beam also appear to support the ceiling below (*plate 3*). Most of these visible only run through this beam and not into the overlying *Joist 2* with the noted exception of one in front of the fire hearth (*photo 48*).



*Plate 3 joists 2 and 3 to left and joist 4 to right, note bolt in joist 3, looking south (photo 23)*

## d) Joist No 04

This joist was a 0.20m wide and 0.16m tall large rough squared beam with some waney edges and deep shakes noted down the beam's length. The plaster ceiling appears to be possibly attached to the underside of this beam; although there appears to be a little gap beneath the beam, so either there is a smaller beam beneath to hold the plaster or maybe the ceiling has detached a little (*plate 4*).



*Plate 4 joist 4 showing deep shakes and possibly detached plaster, looking south (photo 24)*

It is possible that bolts run through this beam supporting the plaster below as on *joist 3* but these were not seen within this limited exposure. These bolts are suggested by a client supplied photo of magnets attached to the bolt ends hidden within the plaster below; this suggests some bolts further out than *joist 3* and may strengthen the theory of the plaster detaching and requiring being bolted up into the floor structure.

The floor above was levelled with a reused bit of timber (with relic square nails) trimmed back to fit the uneven/sagging top of the beam. A small sliver of much more recent wood had been screwed on top to further level the flooring in front of the fire; this may possibly relate to the bolting up of the ceiling below or just a little modern re-levelling of the sagging floor.

Between *joists 3* and *4* a modern looking plank had been inserted; this involved cutting into *joist 3* for a seating to hold the plank, possibly to keep the joist separate. It may be that this was inserted because *joist 3* was moving sideways with the hearth above, or was perhaps to hold something from below.

## e) Joist No 05

This was a 0.12m wide and 0.06m high rough squared ¼ caber beam with waney edges directly supporting the flooring and with a large gap between this and the underlying *joist no 6* (*plate 5*).





Plate 5 joists 5 and 6, 5 at top right, 6 at bottom right shows gap between, shakes and bark on the timbers, looking south (photo 28)

f) Joist No 06

This joist was a 0.13m wide and 0.11m high rough squared beam with the bark still on waney edges. The beam directly underlies *joist 5* with a large gap between. The plaster ceiling is attached to the underside. Deep shakes run down much of the length of the beam (photo 28/51)

g) Joist No 07

A 15 cm wide and 18 cm high rough squared large beam, the plaster ceiling is attached to the underside of the beam. The uneven upper face is levelled with reused timber boards for the floor (plate 6).



Plate 6 joists 7,8 and 9, joist 7 to right, joist 8 top left and 9 bottom left looking north (photo 40)

*h) Joist No 08*

This was a 0.11m wide and 0.06m tall ¼ caber with waney edges, the beam directly supports the floor with a gap between this and the underlying *joist 9* (*plate 6*).

*i) Joist No 09*

Joist 09 was a 0.13m wide and 0.10m tall rough squared beam with waney edges. It sits below *joist 8* and supports the plaster ceiling below. Some shakes were noted on its west face (*plate 6*).

*j) Joist No 10*

This was a 0.18m wide and 0.15m tall squared large beam, the floor sits on top. *Joist No 11* appears to be attached to the underside of this to carry the plaster ceiling below (*plate 7*).

*k) Joist No 11*

This was a 0.12m wide and 0.06m tall rough squared timber apparently attached to the underside of *joist 10* to fill the gap below and support the plaster ceiling (*plate 7*).

*l) Joist No 12*

0.11m wide and 0.08m tall squared caber supporting the floor with a wide gap between this and underlying *joist 13* (*plate 7*).



*Plate 7 joists 10,11,12 and 13, joist 10 to upper right, joist 11 lower right, joist 12 top left and 13 bottom left, looking north (photo 45)*

*m) Joist No 13*



0.11 x 0.11m squared caber still with some bark on waney edges and shakes down its length. The plaster ceiling was attached to the underside and there was a wide gap between this and overlying joist 12 (plate 7).

n) Joist No 14

0.12m wide and 0.15m tall large squared beam with shakes along its length; the flooring sits on top but the plaster ceiling doesn't reach the underside. A series of smaller timbers were attached to the underside running towards the west wall, which may suggest that this joist supports the cornice below (plate 8).



Plate 8 joists 14, 13 and 12. Joist 14 to left, 12 to upper right and 13 to lower right.

o) Joist No 15

This is an irregular beam that may run along the top of the fireplace below and is possibly related to the cornice around the fire breast (see plate 2 /photo 22).

### 3. Discussion

The floor structure can be simplified and divided into three main phases/structural elements, with the first (*Phase 1*) represented by five larger widely spaced beams forming a floor structure made up by joists 14,10,07,04 and 01 (*figure 3, in red*); these are generally larger solid squared beams set into the masonry of the elevations. These are often quite irregular so unlikely to have been visible at any time. On the south elevation some surviving *in situ* wall plaster above the ceiling may run up to the joists and the floor boards above, although this could just have been done as preparation for the 17<sup>th</sup> century ceiling. These joists are likely to be original to the tower, although closer inspection of the junction with the masonry would be required to confirm this.

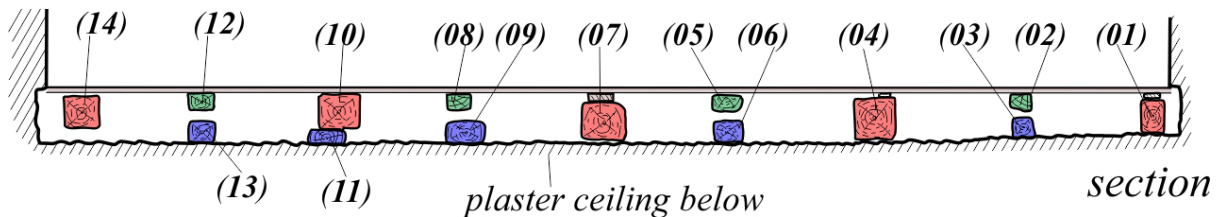


Figure 3 sample section through floor showing joists

*Phase 2*, The flooring was given secondary support by quite slight quartered /halved cabers, which ran between the main beams, this was made up by joists 02,05,08,12 (*in green*). These may have been cut into the masonry of the south elevation but this was not clear as there was a lot of loose masonry in the wall and debris obscuring the elevation; as with the main joists above closer exposure along the wall foot will help determine this. These beams appear to relate to the current floor boards and so the reused bits of timber levelling out the top of the earlier main beams also must relate to this phase.

*Phase 3*, The plastered ceiling dated 1617 was held up by a number of lower joists (*in blue*); these then are likely to date to about 1617 and are better formed than the *phase 2*, comprising apparently whole cabers squared (where seen) rather than the split cabers above.

Whether this ceiling was related to the levelling and strengthening of the floor above or was later can't be said with certainty but it seems probable that the two operations could be contemporary. The neat pairing of the joisting for the flooring and ceiling below may suggest this is indeed of the same phase.

The wide gap between the upper *phase 2* and lower *phase 3* joists may be an attempt to reduce vibration transfer from the floor above to the plaster ceiling below. If the gap is indeed an original design to reduce vibration to the ceiling, then the modern bolting up rigidly fixing the plaster ceiling joists with the floor joist against which the overlying stone fire hearth rests may be transferring the vibration and weight of the hearth and floor directly into the ceiling below, and thus causing the observed movement within the plaster (*plate 9*).



Plate 9 bolt from plaster ceiling below joining joists 2 and 3 with timber packing between joists



Appendix A photographic contact sheets

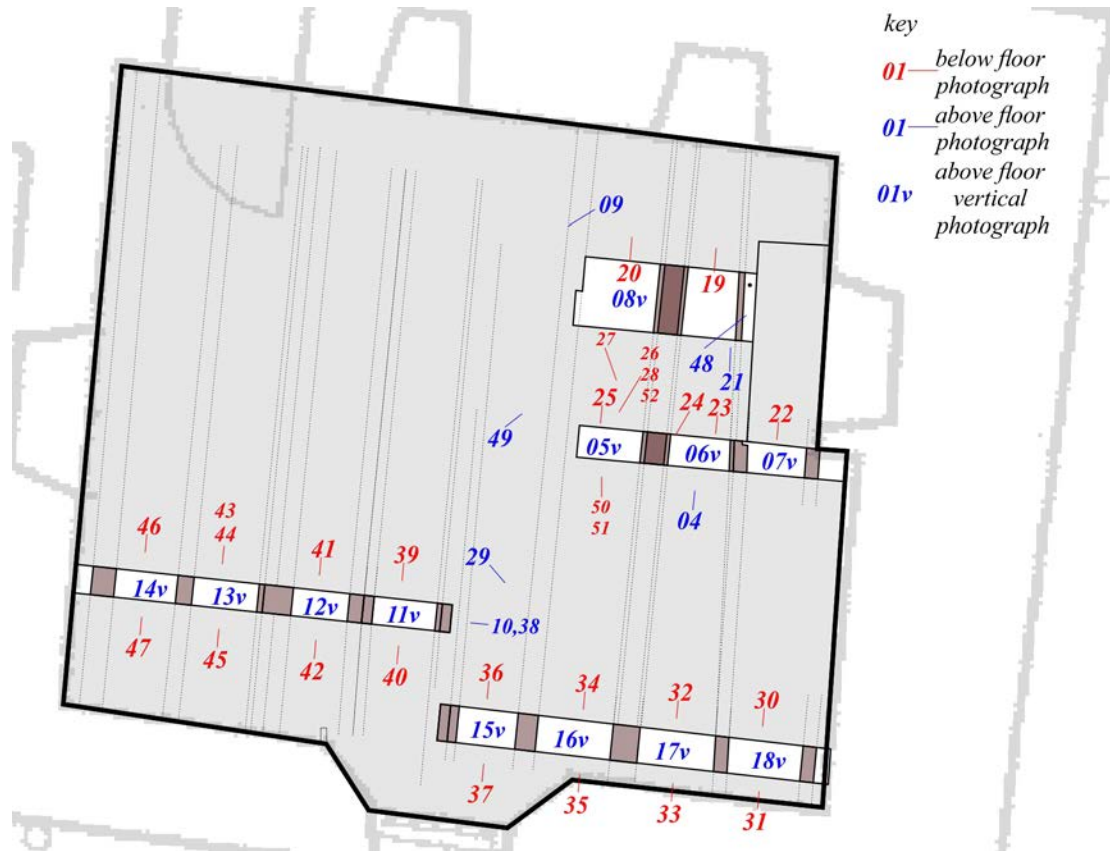


Figure 4 Photograph location plan



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