Winter Common Room Project Magdalen College, Oxford

Historic Building Investigation and recording

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Magdalen College, Oxford

Historic Building Recording and Watching Brief

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Summary

Oxford Archaeology (OA) has undertaken historic building recording at Magdalen College, Oxford in relation to the Winter Common Room Project. The project is aimed at improving access between parts of the college and it affects two Grade I listed buildings: the south range of Cloisters (or the Great Quadrangle) and the northern part of Chaplains III.

The main recording work in the Great Quadrangle focused on the Old Bursary area where the removal of modern elements exposed structural features of historic interest. The original floor joists substantially survive above the Old Bursary together with a north-to-south partition which divided the main room from a pair of smaller rooms to the west. The plaster has been lost from the partition but four of the main studs survive together with much of the head rail and part of the sole plate.

Dendrochronological analysis shows that both the floor and the partition were constructed with trees felled in 1474 and this corresponds with the date when construction works are known to have started in this range. The foundation stone of the chapel in the western part of the range is known to have been laid in May 1474 and thus we can be confident that these structural elements in the Old Bursary were original. They also appear to confirm that the entire south range of the Great Quadrangle was constructed in a single phase.

The work in the Old Bursary also exposed another partially surviving partition on the north side of the main room and dendrochronology has shown that this was constructed with timber from trees felled in 1583. This partition incorporates a doorway and it retained historic plaster, including a daub which is likely to be primary. The doorway would have provided access to a small room serving the bursary.

The works have also exposed features of some interest in the Chaplains III range which is believed to have been constructed in the early 17th century. This range has been much altered in the 20th century with the replacement of the original staircase in 1911, the insertion of some structural steelwork in the 1960s and extensive refacing of external stonework.

However, although very little primary internal fabric survives the investigation identified apparent evidence of a substantial phase of alterations probably from before 1850. Tall joists and a number of stud partitions at first floor were exposed, the character of which appeared to suggest a mid 19th century date or earlier. Other evidence appears to confirm that they pre-date the 1911 work.

The creation of a new doorway at the north end of Chaplains III showed that this part of the wall incorporated a series of reused moulded stones, set backwards with the flat side facing outwards. These stones were suggestive of a post-medieval date.

1 INTRODUCTION

1.1 Project Background

1.1.1 Oxford Archaeology (OA) has been commissioned by Robert Langley, surveyor, on behalf of Magdalen College Oxford to undertake a programme of historic building investigation and recording in relation to a development at Magdalen College. The development (ref 18/03281/FUL & 18/03282/LBC) focuses on an area to the south of the great quadrangle (service yard, Old Bursary, Senior Common Room and Chaplains III) and forms part of the wider Winter Common Room Project. It aims to improve the college's outlying dining and reception facilities and enhance links to the main dining hall. It includes internal alterations to existing buildings as well as the erection of a new kitchen and servery.

1.1.2 The recording has focused on two Grade I listed buildings at the College (cloister of Great Quadrangle; Chaplains III buildings) which are directly impacted by the works. The college is also within the Central Conservation Area.

1.1.3 Listed building consent and planning permission have been granted, each with the following condition:

1.1.4 The development hereby approved shall only take place when the applicant has secured a programme of architectural recording by measurement, drawing and photography before the relevant part of the work commences on site. The recording shall be in accordance with a written scheme of investigation, which has been submitted firstly, and approved in writing by, the Local Planning Authority. The recording shall be carried out to recording level 4 of Historic England's, 'Understanding Historic Buildings: A Guide to Good Recording Practice', 2016)

1.1.5 *One copy of the archive of record documents shall be submitted to the Local Planning Authority for deposit in its HER in bound and in digital form and one copy shall be submitted directly to the Oxfordshire Historic Records Centre in Oxford in bound and in digital form. One copy shall be deposited in the archives of the college in digital and bound hard copy*.

1.1.1 A Written Scheme of Investigation for the building recording (OA, 2019) was approved by Oxford City Council and this document reports on the results of that work.

1.1.2 OA has also undertaken an archaeological watching brief during ground works related to this project. A separate report has been produced detailing the findings of that investigation.

1.2 Project aims

1.2.1 The overall aims of the project were:

- to investigate and record for posterity elements of the college that which will be lost or temporarily exposed during the current works;
- to enhance understanding of the structure and how it related to the overall college;
- to make the record publicly accessible through a report (a public document) and a project archive deposited with a public institution.
- To determine the location, extent, date, character, condition, significance and quality of any archaeological remains within the development;

- To determine or confirm the approximate date or date range of any remains, by means of artefactual or other evidence.

1.3 Methodology

1.3.1 The recording has focused on the areas being directly impacted by the development works and it has been undertaken in a phased programme. It has included initial outline recording prior to the development and further recording during the works to cover features which have been exposed.

1.3.2 It has also been supported by historical research based on historic maps, previous studies and the principal secondary sources. Research of primary archives has been restricted due to the Covid-19 pandemic.

1.3.3 The building recording and watching brief was undertaken during a series of visits between July 2019 and February 2020.

2 BACKGROUND HISTORY

2.1 Location

2.1.1 The current investigation focused on elements of several buildings at the northern end of the Maintenance Yard (which has gated access onto the High Street), located in the south west corner of the historic core of Magdalen College. This area is part of the wider Winter Common Room redevelopment scheme, which incorporates alterations within the immediately adjacent historic structures of South Range of the Cloister (north) and the Chaplain's III East Range (west), as well as the modern kitchens to the east.

2.1.2 The college lies within modern Oxford, on the north side of High Street, to the west of Magdalen Bridge and the River Cherwell and east of Longwall Street, centered on National Grid Reference (NGR) SP 5210 0616 (Fig 1).

2.2 General background to Magdalen College

2.2.1 Lying to the north of a principal routeway into the eastern side of the Saxon burh, and the later East Gate of the walled medieval town, the site is within the vicinity of an extramural burial ground belonging to Oxford's 12th and 13th century Jewish community. At the earliest, this cemetery would have been in use from 1140 when Jews arrived in England at the invitation of King Stephen, until Henry III acquired the land in 1231 and granted the land for the re-founding of the Hospital of St. John the Baptist.

2.2.2 In 1457 the hospital was suppressed and formed part of an area of land granted to Magdalen College. The college was founded on the site in 1458 by William Waynflete, Bishop of Winchester and Lord Chancellor. Waynflete demolished the buildings of the hospital in 1467, except for the chapel (which forms part of the High Street range) and part of the hall which eventually became a college kitchen (OA 2009). At this time work also began on the wall, now known as Longwall, which circled the whole of Magdalen College.

2.2.3 From 1474 works began on the Cloisters (known as The Great Quadrangle), with the foundation stone to the chapel being laid and blessed on 5 May of that year. By 14 November 1474 the stonework is reported to have been raised to window sill level although it is not believed that the Hall and Chapel were completed until the end of the

1470s (Brockless, LWB (ed) 2008). The master mason and architect for the works was William Orchard (active 1468-1504) who is also known to have worked on the Divinity Schools in Oxford.

2.2.4 Construction of the Muniment Tower has previously been dated to 1474 and the adjacent State Rooms to 1476 and 1477 which clearly shows that these elements of the college were all constructed at broadly the same time (Miles, 2020). This constructional phase included the Senior Common Room (and Old Bursary) which includes some of the main works in the current project. The majority of the timber for the range was obtained from the royal forest of Shotover, although some was sourced from Witney, Woodstock, and the royal forest of Wychwood (Miles, 2020).

2.2.5 The list description states that the south side of the Great Quadrangle was not completed until 1490.

2.2.6 Works started on the construction of The Great Tower in 1492 and were completed in 1509 (RCHME 1939), with the bells and clocks installed in 1505. It is also during this period that the completion of a set of buildings to the east of the tower, now known as the Chaplain's III East Range, was completed to connect the tower with existing buildings. During the 17th and 18th century these buildings were redeveloped with the northern most limits of this range being a 17th century addition to the earlier 16th century building (RCHME 1939).

2.2.7 In the 1720s proposals were prepared by Edward Holdworth for an ambitious scheme to replace most of the Great Quadrangle with a set of modern Palladian ranges and in the following decade what is known as the New Building was constructed to form the north side of the new quadrangle.

2.2.8 Following the completion of this range the wider scheme was halted and eventually abandoned but Holdsworth's original drawings provide some evidence relating to the current project. One plan (Fig 3) shows what is now the Winter Common Room as a single space labelled *Common Room under the hall*; adjacent to this the plan shows the passage and to the east of this is another single space labelled *Bursary under the hall*. Various features of historic interest have been found in the current work in this area which is known as the Old Bursary. Holdsworth's plan also shows the north range of Chaplains III divided into three sections: one room towards the north end and two further spaces to the south of this, one either side of the staircase. This staircase was replaced in the early 20th century.

2.2.9 Although the grand plans in the 1720s for a Palladian quadrangle were abandoned various works were undertaken in the 1820s and 1830s. Work on a further scheme to replace the north range commenced but was then halted due to protests and abandoned in favour of a less destructive proposal to remodel the building. Works were also undertaken in this decade to the east and west ranges of the cloisters.

2.2.10 The first edition Ordnance Survey map, particularly the 1:500 Town Plan published in 1880 (Fig 4) provides detail on the layout of the college and in relation to the current project it labels the north range of Chaplains III as *Servants Rooms*. The plan also confirms the location of the previous staircase within Chaplains III.

2.2.11 In the 1880s George Frederick Bodley and Thomas Garner carried out several projects at Magdalen, namely St. Swithun's Quadrangle, a new President's Lodgings, and a gate from High Street. St. Swithun's Quadrangle was left half-complete.

2.2.12 During the early 1900s renovations of the buildings at Magdalen College reverted to a more medieval character. Significant alterations were undertaken to Chaplains III in 1911 when two original staircases were removed and replaced with a single corner spiral staircase.

2.2.13 The are several plans from the early 20th century which provide further evidence relating to the current project and each of these has been reproduced in documents produced for the planning submission of the current project. The earliest of these plans was by Wynn Owen and was dated 1906. This shows the main part of the Old Bursary as comprising a Smoke Room with smaller rooms to west and north. The smaller rooms are not labelled on the plan but they are in the same location as what later became the Linen Store, Crockery Store, Wine Store, College Shop and Shop Store. The space that later became the Crockery Store was divided in two and there was direct access into each of these from the Smoke Room.

2.2.14 Plans also survive from the 1911 works (Fig 5) which label the northern part of Chaplains III as *Common Room Service* and to the south of this an *Ante Room*. The first floor and attic of this range each provided two bedrooms, two sitting rooms and a shared pantry. A plan by Herbert DuLake from 1931 shows the Old Bursary area with a very similar layout to that shown on the 1906 plan as does a plan contained in the RCHME's 1939 Inventory of Historical Monuments of Oxford (Fig 6).

2.2.15 Chaplains III is known to have undergone various works in the second half of the 20th century. In 1955 it was partly refaced in synthetic stone, in the 1960s some internal structural timber was replaced due to death watch beetle and then further external stone repairs were undertaken in the 1980s.

2.2.16 The list description for the Cloister of the Great Quadrangle states:

2.2.17 Was built 1475, the South side being finished 1490; the West range includes the old library which has a partly renewed timber roof of probably early C17. The exterior North front was rebuilt 1823-4 in Bath stone and the exterior of East and South sides in 1825-27, the architect being James Parkinson. Parts were refaced in concrete or synthetic stone, in 1946. The South Alley was re-roofed 1921-2.

2.2.18 The list description for the Chaplains III building states:

2.2.19 Early C16 incorporating parts of St John's Hospital, including remains of C14 Chapel; partly reconstructed 1665-6. Towards East end is Bell Tower, 1492-1500, with short ranges to East and West completed by 1509. Extending to North at East end is an early C17 wing which now forms the East side of the Chaplain's Quadrangle. Partly refaced in synthetic stone, 1955. Gatehouse altered 1957.

3 SOUTH SIDE OF GREAT QUADRANGLE

3.1 Historical background

3.1.1 As outlined above construction of Magdalen College started in the 1470s and the foundation stone of the chapel was laid on 5 May 1474. Dendrochronological analysis undertaken as part of the current project suggests that the eastern half of the Great Quadrangle's south range also dates from this phase of construction although the list description states that the south range was not completed in 1490.

3.1.2 The plan of Magdalen in the RCHME *Inventory of the Historical Monuments in the City of Oxford* (1939) labels the whole of this area as Senior Common Rooms and it adds that the room to the east of the passage was a Smoking Room. The RCHME states: '*The Fellows Smoking Room, formerly the Bursary, has an original doorway, with moulded jambs and four centred arch in the N. wall; above this and the Common Room doorway are 17th-century cartouches of the royal Stuart arms and those of the founder; the room is lined with reset early 17th century panelling with an overmantel, probably of the 18th century. In this room is a 14th-century chest'.*

3.1.3 In the mid 20th century the old bursary area was converted to various stores and other functional rooms.

3.2 Outline description prior to works

3.2.1 The works within the Great Quadrangle focused on the east half of the south range; this includes the Winter Common Room, a passage through the range to the cloister and a set of rooms to the east (the Old Bursary).

3.2.2 Prior to the start of the current development works the Old Bursary Area was divided into several rooms which were largely used as stores. Immediately east of the passage there was a small Linen Store to the south and similarly sized Crockery Store to the north. Access to both rooms was from the south via a small, single storey mid-20th-century lobby structure which formed a link between Chaplains III and the Quadrangle. To the east of these two small rooms in the Old Bursary was a Music Store and to the east of this was another general store space. These two rooms were created in the 20th century from what had been the Fellows' Smoking Room. To the north of them was a small space used as the College Shop, accessed from the cloister, and a very small shop store.

3.2.3 These rooms all had a utilitarian character with modern plaster, painted white and few features of visible historic interest (Pl. 1-4). In the east wall was a fireplace with timber surround and decorative glazed tiles similar to two other fireplaces in the Chaplains III building (discussed further below). These are suggestive of an early 20th century date.

3.2.4 At the north-west corner of the Old Bursary area is a Wine Store although this was not being impacted in the works and no access to it was possible.

3.2.5 The Passage has a stone flag floor and in the east wall there are historic stone doorways towards each end beneath four-centred arches (Pl. 6, 34-37). The southern of these two doorways, which adjoined the Linen Store was blocked with brickwork, apparently in the mid-20th century. It is shown as being open on Herbert DuLake & Co's 1931 record plan of the college. The central part of the passage has a stone vault above it which formerly supported the central hearth in the hall above. Along the east side of the passage was a modern food servery counter.

3.2.6 The Winter Common Room is a high-status area with late 17th century panelling to the walls, a coffered ceiling and a stone fireplace in the west wall (Pl. 5)

3.3 Recording and observations during works

3.3.1 **Old Bursary**

3.3.2 The removal of plaster from the walls and ceilings of the Old Bursary area exposed a number of features of historic significance.

3.3.3 ***North-to-south partition*****:** The north-to-south wall which divided the Linen and Crockery Stores from the Music Room was found to be a well-preserved timber-framed partition which survives from the original construction of this part of the college (Fig 9, Pl. 7-15). Dendrochronology sampling provided felling dates of 1474 which correlates closely with documentary evidence showing that construction of the chapel in the western part of the South Range commenced in May 1474.

3.3.4 The exposed oak frame is c.6m long and it would originally have comprised five studs between sole plate and principal joist (or head rail). The central stud has previously been replaced by a steel post (probably in the mid-20th-century phase of works) but the other four primary studs survive together with approximately half the sole plate and almost the entire head rail; the only part of the rail which no longer survives is the central point where the head of the steel post was inserted. The head rail (c.30 cm^2) has stop chamfers to each end and it is worth noting that at the north end this stop chamfer respects the corner of the wine cellar suggesting that this was the primary arrangement rather than the wine cellar being a secondary addition. The head rail is immediately beneath the height of the east-to-west bridging beam in the floor (detailed further below).

3.3.5 The primary studs have been numbered 1-4 in the current report (from south to north) and each one is tenoned into the head rail. Each stud is c.22 cm wide by 10 cm deep and each one has traces of paint. Immediately against the south side of Stud 4 there is an additional stud which appears to have been a secondary addition.

3.3.6 The sole plate (c.20 cm^2) survived largely in the southern half of the frame but the only fragments that survived in the northern half were beneath the two studs (Studs 3 & 4); either side of this the plate had been removed in the past, presumably to allow access between these two spaces. These bays are shown as being open on the 1931 college plan.

3.3.7 The sole plate is set on a stone plinth but again, only half of this survives. The east side of the plinth is covered in a modern concrete render and a date of 1956 is roughly inscribed in this. Presumably this was inscribed by a workman and it provides a likely indication of the date of the major remodelling of this area which is known to have taken place at some point in the mid 20th century.

3.3.8 The removal of plaster showed that the infill of the southern two panels was of 20th-century brickwork while the central panel was concrete and hard plaster and the northern panel was concrete blockwork.

3.3.9 The infill has been removed from the panels as part of the current work and this has exposed a series of 14 mortices in the underside of the head rail from former intermediate studs. The removal of the infill also exposed a groove in the upper face of the sole plate.

3.3.10 East-to-west partition: The removal of plaster from the north side of the Old Bursary revealed that part of this wall was also older than previously thought and of greater

heritage significance. The easternmost section of this wall is of stone and it forms the rear side of the staircase which rises up to the hall. This wall was clad in modern plaster on wire mesh but the section immediately west of this (ie the western half of the north wall of the Store) is a historic section of oak stud wall which has been dated by dendrochronology to 1583 (Fig 10, Pl. 16-24).

3.3.11 The framing in this section of wall incorporates two full height posts, a mid-height rail and a further mid-height post beneath the rail. The rail acts as a lintel for a former doorway and the outline of this doorway is indicated by a chamfer which continues along the inner side of the two posts and the underside of the lintel. The main structural members to the frame are all pegged. Traces of the former sole plate also survive but this is very rotten.

3.3.12 Historic plaster of various dates survives within the frame; the oldest appears to be that within the narrow panel to the east of the former doorway where there are widely spaced laths with a daub containing straw but apparently no hair. A finer surface plaster has been applied on top of the daub.

3.3.13 The upper panel (above the rail) comprised a rough plaster on laths with a large amount of hair mixed within it. This plaster has been removed in the current work and this exposed a central stud within this panel and two smaller studs to each side, one of which was set diagonally. The lath and plaster within the former doorway also contains some hair but less than in the panel above. The base of an additional stud can be seen within the doorway, where the plaster has partially come away, and this would clearly have been inserted when the door was blocked.

3.3.14 The east edge of the frame is against the historic stone wall (referred to above) with a corbel at its head to support the underside of the staircase. This was initially covered with modern plaster on wire mesh but a small part of this has been removed to show that the stonework is painted white but darkened in places by smoke.

3.3.15 The original proposal was to remove this wall but once the frame was exposed the plans were modified to allow it to be retained. The former doorway has been reopened and the frame has been raised slightly to provide the required head height through the opening. The wattle and daub has also been retained.

3.3.16 The western half of the north wall (ie the north wall of the Music Room store) also comprised a stud partition but this was later in date and formed from regular softwood studs (c.8 cm x 6 cm) without any raking braces. This has been removed in the current project. The south side of the partition was clad in modern cement plaster on wire mesh (possible 1950s phase of alterations) fixed to thin modern lengths of softwood attached to the faces of the older studs. The north side of the partition was of lath and plaster although it could be seen that this had been covered in later boarding.

3.3.17 The studs are suggestive of a probable late 19th-century date. Some of the laths are unusually wide (up to 6 cm wide) which can be indicative of an early date but in this case this is likely to be misleading.

3.3.18 Within the western part of the partition is a section of concrete blockwork that clearly indicates a former infilled doorway. This doorway is shown on the plan in the 1939 *RCHME Inventory of Monuments of Oxford.*

3.3.19 When the partition was removed plaster was exposed on the wall to the west (east side of east wall of Wine Store) confirming that the partition was a secondary addition. Plaster was also exposed to the ceiling above the partition.

3.3.20 The strip-out works exposed a pair of circular section cast iron columns with simple capitals within in the north wall, between this partition and the older one dated to 1583 (Pl. 24). These were boxed in prior to the works and it is unlikely they were ever visible.

3.3.21 ***Ceiling:*** the removal of the ceiling from the various rooms that formerly comprised the smoking room allowed a close examination of the underside of this part of the first floor structure (Fig 11, Pl. 26-29). The structure was divided into an eastern and western half (ie Music Store to west and general Store to east) by a coupled pair of steel I-beams along the central line, orientated north to south and encased in boxing. These I-beams were stamped Dawney and were inserted in the mid-20th century, presumably to replace the primary joist along the same alignment.

3.3.22 At its south end the pair of I-beams were embedded within the stone wall while at the northern end they were supported by the pair of slender, circular-section cast-iron columns referred to above with simple capitals. These columns were encased in boxing and probably dated from the mid-20th-century works.

3.3.23 The north-to-south steel principal joist supported further east-west bridging joists to either side: towards the northern end of the room the primary bridging joist (32 cm x 32 cm) survived to each side but further south, towards the centre of the room, the primary bridging joist had been partially removed. Here, in the bay to the west (Music Store), the primary bridging joist had been fully removed and replaced by a further steel I-beam but in the bay to the east the primary oak joist remained in-situ, sandwiched between two steel joists which supported the north-to-south common joists to each side. This primary joist is also 32 cm^2 and had chamfered edges as well as axe marks to its sides. The truncated stubs of the primary floor joists are also visible within it.

3.3.24 The primary floor joists to the eastern half (*Store*) have been entirely replaced in the central and southern bays by tall softwood common joists of mid-20th-century date; the boards above these are also modern. These common joists are 24 cm tall by 8 cm wide. The only primary joists that survive in the east half are those towards the northern end between the north wall of the room and the surviving historic bridging beam. There are eight joists here, each of which are squat in section (18cm tall x 15 cm wide) and closely spaced.

3.3.25 One other feature to mention in the eastern half of the room is an irregular length of dark historic timber (c.2m long x c.40 cm wide x c.7 cm tall), orientated north-to-south and apparently encased between the later joists below and floor boards above (Pl. 30).

3.3.26 In the bay to the western side of the former smoking room (ie the Music Store) the primary floor joists survived, oriented north-south, in each of the three bays. There are 10 joists in each bay, c.18 cm x 15 cm, and they are again squat in section and closely spaced. At the northern end they are tenoned into the surviving primary bridging beam while towards the centre of the room they are supported by steel plates fixed to the inserted steel bridging beam. At the southern end of the room they are tenoned into a further primary east-west joist immediately in front of the wall.

3.3.27 Thin later boards have been fixed to the underside of the primary joists to even out the ceiling height. The thin later boards also have lath marks to their underside so may be of pre 20th-century date.

3.3.28 The primary floor joists also survive in the western part of the Old Bursary (ie the Linen Store and Crockery Store). In this area the primary east-west principal joist continues through and into each side of which there are tenoned six primary common joists (Pl. 25).

3.3.29 One other minor feature of note in the Store room was that when a modern dado rail was removed it revealed an aquamarine colour beneath. The dado rail may have been added in the 1950s phase and the aquamarine may therefore have been the colour from when this area was the Fellows' Smoking Room.

3.3.30 ***Passage:*** the main alteration work within the cross passage was the creation of a doorway in the stone wall to the east to connect through to the adjacent room. This confirmed that this section of wall was of coursed stone construction with a rubble core (Pl. 38-40).

3.3.31 ***Winter Common Room***: Very little significant work was undertaken in the Winter Common Room although some wiring work was undertaken which involved lifting some of the floorboards in the southern half of the room. The boards here are very narrow and both they and the joists beneath are suggestive of a 20th-century date. Beneath the joists there is a void and c.35 cm beneath the floorboards there is an earlier surface apparently formed from cobbles or setts (Pl. 42-43). One section of the 17th-century panelling was also removed from the centre of the east wall and this exposed a featureless stone wall with what appeared to be a lime render which obscured the individual stones (Pl. 44).

3.3.32 First floor window to hall lobby

3.3.33 A record was made of the first floor window towards the east end of the south elevation of the hall prior to it being converted to a doorway. This is adjacent to the first floor lobby of the hall. Research undertaken as part of the planning submission suggested that the window was probably inserted in the late 18th or early 19th century and the visible stonework strongly suggests that it has been heavily reformed.

3.3.34 The window has three lights with mullions, simple tracery and a hood mould. There is a moulded string course to the main elevation of the building which steps down to accommodate the window. The main stonework to the window and immediately either side is a golden colour stone (possibly Taynton stone) and its crisp edges are suggestive of a 20th-century date. The stonework incorporates pointed relieving arches above and below the window; there are also patches of green staining above the window.

3.3.35 The stonework beneath the window is also reformed and although it incorporates various stone types they are largely a light cream colour.

3.3.36 The construction of the adjacent kitchen range in the 1980s, on the east side of the Maintenance Yard, involved the partial truncation of the moulded window sill, at the point where the new roof adjoins. A scar was also formed for the roof flashing.

4 CHAPLAINS III

4.1 Historical Background

4.1.1 The building known as Chaplains III has an L-shaped plan and while the southern range facing the High Street is of early 16th century date the longer northern element comprises an extension of early 17th century date. Only the 17th-century part of the building was covered by the current recording.

4.1.2 The building was significantly remodelled in 1911 when the two primary staircases were replaced by a single spiral staircase at the junction between the ranges. The location of the previous staircase is shown on Figures 3-4. The west façade was remodelled at the same time.

4.1.3 In c.1962 some of the internal structural timber had to be replaced due to the presence of dry rot and death watch beetle. In the mid-1970s the elevations were heavily refaced in a light coloured ashlar, other than the stone which itself had been replaced in 1911.

4.2 Chaplains III Ground floor

4.2.1 As stated above the current recording only covered the north range of Chaplains III and it focused on areas which were being directly impacted.

4.2.2 PRIOR TO START OF WORKS

4.2.3 At ground floor level the northern arm of Chaplains III comprised a relatively large Ante Room to the south (adjacent to the spiral staircase) and a series of small rooms to the north including a kitchen, a butlers room and two WCs. The original staircase was in what is now the Ante Room in the southern half of the range and this area survived relatively little altered from the 1911 remodelling works; the layout of the northern half of the ground floor appears to have largely dated from the 1960s phase of alterations. The 1911 plan shows a pair of rooms in the northern half labelled *Common Room Service* together with a corridor/lobby along the west side which provided access between the Ante Room and the rooms around the Great Quadrangle.

4.2.4 The principal feature of the Ante Room is a stone fireplace in the east wall, inserted in the 1911 works, and with decorative tiles to the splays (Pl. 56). The stone surround and tiles are similar in style to another contemporary fireplace in the larger adjacent room to the south (the Dining Room within the older southern element of Chaplains III) as well as one in the Old Bursary area to the north. To the north of the fireplace there are two stone mullioned windows in the east wall which were also inserted in the 1911 phase (Pl. 57). These have an Arts and crafts design with leaded lights and wrought iron window latches). The stone spiral staircase is also of finely crafted traditional construction and can be seen as part of an attempt in this period to enhance the historic character of the buildings at Magdalen.

4.2.5 The corridor and rooms to the north half of the range had a plain utilitarian character with plastered walls and minimal decoration.

4.2.6 Three primary east-west floor joists survived in the northern half of this range, including one within the northern end wall.

4.2.7 OBSERVATIONS DURING WORKS

4.2.8 The refurbishment works confirmed that the ceilings through the ground floor were of lath and plaster on tall secondary softwood joists orientated north to south (Pl. 59-63). In the northern half of the building these joists were tenoned into the three primary principal joists which spanned the building east to west (including that in the end wall). The outline of the original square-section joists could be seen in the face of the principal joists and their mortices had been adapted and partially reused to house the taller replacement joists Pl. 62).

4.2.9 The underside of the first floor structure within the ante room could be seen and this had been more comprehensively overhauled in the 20th century (1960s) phase of works. It comprised east-to-west steel joists (I-section) supporting the north-to-south common joists. Common joists with lath marks remained in-situ but they were strengthened at each end by later spur joists without lath marks bolted to their sides. It appears that during the 1960s works the existing floor at least partially remained in-situ while the original principal joists were replaced by steel I-beams and the ends of each of the common joists were removed.

4.2.10 The walls which formed the rooms in the northern half of the range were of brick and the underside of brick hearth was exposed towards the north end of the east wall.

4.2.11 A new doorway has been created as part of the current project at the north end of the ground floor through the historic end wall and the material removed included a number of moulded stones. These had been reused and set backwards so that the flat side was facing outwards (Pl. 68-82). This end wall is believed to date from the 17th century and the stones that were removed were suggestive of a post-medieval date.

4.2.12 The nine main moulded stones that were removed were all of sandstone and several had fragments of white paint surviving. Brief notes are included below:

4.2.13 **Stone 1** (Pl. 72-73) appears to have been part of a window/door jamb and has a splay and several mouldings to one face including a half roll. One side has been truncated but flat surfaces have been formed to two of the other sides. The stone measures c.30 cm x c.28 cm.

4.2.14 **Stone 2** (Pl. 74-75) would have been part of a window jamb, shown by a fillet recess for the window. Traces of paint remain. It is c.25 cm long by c.15 cm deep. There are mouldings to three sides, including two cavetto moulds, and a single flat face.

4.2.15 **Stone 3** (Pl. 76) has mouldings to two sides including a cavetto mould and it measures c.20 cm long x 15 cm tall. This probably also formed part of a jamb.

4.2.16 **Stone 4** (Pl. 77) is c.25 cm x 20 cm and has mouldings to two sides, including an ovolo mould. This was probably part of a window jamb or mullion.

4.2.17 **Stone 5** (Pl. 81) has one sloped face and it would probably have formed part of a plinth or sill. It has flat sides to the rear, the sides and base and it measures c.32 cm x 20 cm.

4.2.18 **Stone 6** is a small fragment (c.15 cm x 5 cm) and incorporates a roll mould.

4.2.19 **Stone 7** (Pl. 80) would probably have formed part of a jamb and has a cavetto mould to one side. It is c.30 cm x 30 cm.

4.2.20 **Stone 8** (Pl. 78) has mouldings to both main sides (cavetto and cyma reversa) and would have formed part of a jamb. It measures c.20 cm x 5 cm.

4.2.21 **Stone 9** (Pl. 79) has mouldings to both main sides and a single smooth (finished) face. It measures c.15 cm x 15 cm (but truncated) and would probably have formed part of a jamb.

4.2.22 In addition to the moulded stones that were removed from the doorway a number of other moulded stones were also left in-situ but partially truncated by the formation of the opening. The mouldings of these were visible in section (Pl. 70-71).

4.3 Chaplains III first floor

4.3.1 PRIOR TO START OF WORK

4.3.2 A plan contained in the planning submission documents by Robinson Thorne Architects shows that following the 1911 works the northern arm of Chaplains III had rooms for two students at first floor: each had a small bedroom and a larger sitting room (Fig 5). The sitting rooms were at each end of the range and at the centre was a shared pantry. There was a corridor along the west side of the floor which provided access to the rooms.

4.3.3 All the rooms were plastered and with relatively plain decoration (Pl. 83-86). The skirtings were plain while the doors from the corridor had bolection mouldings to the architraves. The doors themselves were all slightly different to each other. Towards the northern end of the corridor was a small lobby with a leaded light above the doorway and the character of this suggested it would have formed part of the 1911 phase of work. This lobby is shown on the 1911 plan (Fig 5). The room at the northern end had a fireplace with plain softwood mantelpiece and surround as well as green tiles around the hearth. In the north wall there was a central recessed cupboard with shelves and a door.

4.3.4 OBSERVATIONS DURING WORKS

4.3.5 Outer walls: The removal of plaster from the inner faces of the external walls confirmed that these were largely constructed from squared stone blocks, roughly coursed and with traces of paint (largely white). The size of the stone blocks varied but many were c.30 cm tall x 50 cm wide.

4.3.6 At the centre of the southernmost wall a chimney breast was exposed which projected only slightly into the room and within this was a former opening for a fireplace, now infilled with brick and cement mortar (Pl. 100). The outline of the original fireplace (c. 90cm wide) could be seen but it appears that this was remodelled, possibly in the 19th century, to form a narrower opening (c.60 cm wide) with brick sides. The panel immediately above the narrowed opening is also of brick but above this is a course of stone blocks with a shallow arch to the underside. The mantelpiece would have been fixed to these blocks and the fixing holes for this was still visible.

4.3.7 Between the two southernmost windows in the east wall two distinct patches of brick infill were exposed, each one c.0.7m x 0.5m and one above the other (Pl. 102). The upper patch had a slight arched top and the width of the feature narrowed slightly towards its base. These clearly relate to former recesses or removed features.

4.3.8 A further infilled fireplace was exposed towards the centre of the east wall, between the second and third windows from the north (Pl. 107). This also comprised the outline of an original stone fireplace, c.1.25m wide, with a four-centred arch lintel above it and a rough reused timber above. This timber may have been a lacing piece or it may have been inserted when a mantelpiece was removed. The northern half of this fireplace was infilled at some point to create a smaller opening and then this was itself infilled in the 1911 works. Several small fragments of red paint were observed above the fireplace.

4.3.9 The southern end of the west wall was of brick, with an irregular joint between it and the main stonework, and it is likely that this alteration dated from 1911 when the spiral staircase in this area was inserted (Pl. 101).

4.3.10 When the small partition which formed the southern side of the lobby was removed a small part of a decorative scheme was exposed on the west wall. This comprised a chocolate brown colour up to c.1.25 m above the floor and with a thin black horizontal band immediately above this. Above this the plastered wall was painted a very light pink colour. This colour scheme probably dated from the 1911 phase and was preserved by the later lobby wall which set against it when later alterations were undertaken.

4.3.11 ***Partitions:*** Plaster was removed from partitions and ceilings and this exposed the structures beneath. The partitions in the northern half of the building forming the various rooms and corridor were all constructed from softwood studs clad in lath and plaster. Dry loose insulation was found within many of the partitions. The partition between the northern room (Sitting Room) and the adjacent bedroom to the south had a primary central doorway and raking braces to each side (Pl. 90). Although the original lath and plaster survived in-situ it had been covered over by a later plasterboard set slightly in front of the laths. The adjacent partition to the south (ie between northern bedroom and central pantry) had two raking braces meeting at the apex (Pl. 87-88).

4.3.12 It was clear that the door on the east side of the small lobby, at the north end of the corridor had been inserted and a raking brace in the north-south partition had been truncated to allow for it (Pl. 89). The original doorway to this room would have been immediately to the south of the inserted door; the lintel from this remained in-situ (Pl. 92) as well as raking braces to each side (one truncated for the later door). The fact that the south wall of this lobby was a secondary insertion was confirmed by the exposure of plaster to the stone wall to the west when the partition was removed.

4.3.13 It is interesting to note that the lobby and inserted doorway are shown on the plan from 1911 suggesting that the framed partitions pre-dated this. The character of the partitions would support this assessment; they are pegged, there are a number of Baltic timber marks (Pl. 93-94) and the nature of their framed construction would suggest a mid-19th century date (or earlier).

4.3.14 The two main east-to-west partitions in the southern half of the first floor are of brick and may date from the 1911 phase of alterations. The corridor partition in the southern half of the range is of interest as it is formed from what appears to be blocks of plaster, c.21 cm tall, with rush stalks (like bamboo) embedded within them (Pl. 97-98). This may have been an experimental light-weight material with a textured finish to hold plaster. This is likely to also date from the 1911 phase of work.

4.3.15 ***Floor:*** The ceilings throughout the first floor were of lath and plaster and when they were removed it could be seen that they comprised tall joists orientated north to south in north half and east-to-west in south half, with herringbone struts (or scissors struts). In the north half of the building the primary principal joists had been removed and the common joists were supported by the structural stud partitions beneath.

4.3.16 In the southern half of the building steel beams spanned across the southern half of the building to support the common joists and second floor above.

4.3.17 A short stub from the primary principal joist survived in the south half (above the corridor) and here the secondary common joists were tenoned into it. This was partially obscured by modern plaster on wire mesh.

4.3.18 The floorboards in the northern half of the first floor generally appeared historic (possibly mid 19th century) although in the WC they'd been overlain with narrower later boards to create a void for pipes and in the southern half of the building they had also largely been replaced.

4.4 Chaplains III Second floor

4.4.1 Similarly to first floor the second floor also had rooms for two students; each one with a small bedroom and a larger sitting room (Pl. 108-110). The arrangement was slightly different to at first floor level. The decoration was again simple with plain skirtings and architraves. There was bolection moulding to the main doors and a large part-glazed screen to WC with ridged glass.

4.4.2 The room at south end had a fireplace with plain surround and mantelpiece as well as deep red tiles to splays. The room at the north end had a fireplace which has been boarded up and which has a plain timber mantelpiece and surrounds. The floorboards in this room were lifted during the works to expose tall softwood joists (25 cm x 8 cm) and a loose dry insulation (similar to sawdust) in between (Pl. 111-112).

5 SUMMARY AND CONCLUSIONS

5.1.1 Oxford Archaeology has undertaken a programme of historic building recording in relation to the Winter Common Room Project at Magdalen College in Oxford which included alterations to two Grade I listed buildings, Chaplains III and the southern side of the Great Quadrangle.

5.1.2 The development work has exposed a number of features of historic significance, particularly in the Old Bursary area where two historic partitions were exposed as well as the underside of set of historic floor joists. Dendrochronology analysis has shown that the larger partition and the floor structure were constructed using timber from trees felled in 1474. It is known from documentary sources that construction of the chapel in the western half of the south range commenced in May 1474 and therefore we can be very confident that these structures are original elements of this buildings. The work has also confirmed that that phase of construction which started in 1474 comprised the entire south range of the Great Quadrangle.

5.1.3 The partition and floor survive relatively well although it had lost all its original plaster and a phase of alterations in the 1950s saw the insertion of various steel members. The partition includes four of the original main five studs (the central one having been replaced by a steel post) as well as most of the head rail and approximately half of the sole plate.

5.1.4 The second partition has also been subject to dendrochronology and this has suggested a date of 1583 for its construction. This partition, which incorporated a doorway, retained historic plaster including a section of daub that is likely to be primary. It appears that this frame would have formed one side of a small store serving the much larger room immediately to the south. This larger room was the bursary in the early 18th century and served as the Fellow's Smoking Room in the early 20th century.

5.1.5 The works in the northern arm of Chaplains III also exposed evidence relating to the history and evolution of this building. This part of Chaplains III is believed to date from the early 17th century but both the interior and exterior have been much altered. Twentieth century alterations have included the insertion of a spiral staircase in 1911 to replace the original, the reconstruction of some of the internal timber in the 1960s due to death watch beetle and then the refacing of large parts of the external stonework in the 1970s.

5.1.6 The current investigation has confirmed that very little of the internal structure is primary but some parts of the floors and stud walls are of pre-20th-century date and the building appears to have undergone a substantial overhaul, probably in the early 19th century.

5.1.7 In particular the stud partitions of the rooms and corridor in the northern half of the first floor are strongly suggestive of a date from before 1900 and probably before 1850. Such a date is suggested by the nature of the partitions with raking braces, pegged joints, Baltic timber marks and the use of lath and plaster. The first and second floor joists in the northern half of the building also appear to be contemporary.

5.1.8 It is possible that the 1911 phase of works could have incorporated this type of construction as a self-conscious attempt to use traditional building techniques rather than more modern methods but other evidence appears to confirm that it is older. At the northern end of the first floor corridor it is clear from the stud frame that a doorway has been moved slightly to the north to allow for the creation of a lobby; the lintel survives from the former doorway and a raking strut has been truncated to allow for the formation

of the secondary door. A plan from 1911 shows the layout with this secondary arrangement and this confirms that the stud partitions must be of earlier date.

5.1.9 Three of the primary principal first floor joists survive and the mortices from the original common joists have been partially reused (and altered) to accommodate the taller later joists.

5.1.10 The southern half of the range has been more substantially altered in the 20th century including the insertion of principal steel joists into the first floor structure, although even here the earlier (19th C?) joists partially survived with lath and plaster to their undersides.

5.1.11 The works in Chaplains III have included the creation of a new doorway at ground floor level in the north wall and the stonework that was removed included a series of reused moulded stones that had been set backwards with the rear side facing outwards.

APPENDIX A BIBLIOGRAPHY

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Maps

1750 Taylor's map of Oxford
1789 Faden's map of Oxford
1850 Robert Hoggar's map of Oxford
1880 Town Plan of Oxford (1:500)

1899 Ordnance Survey 25 inch:1 mile map

APPENDIX B SUMMARY OF SITE DETAILS

Site name: Magdalen College, Oxford
Site code: OXMWCR19
Grid reference: SP 5210 0616
Type of project: Historic building investigation and recording
Date and duration of project: Main site work undertaken intermittently June 2019 – February 2020.
Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES. It will be deposited with the County Museums Service.

Contents of Archive:
The archive will consist of:

- Digital photographs
- photographic record sheets
- a copy of the full report
- Descriptive site notes
- A copy of the City of Oxford brief for the work

Summary:
Oxford Archaeology (OA) has undertaken historic building investigation and recording works at Magdalen College, Oxford in relation to the Winter Common Room Project; this aims to improve access to the outlying dining and reception areas at Magdalen. The investigation focused on two listed buildings: the Great Quadrangle (South Range) and Chaplains III.

Outline recording was undertaken prior to the start of the development but the main investigation was undertaken during it. A number of significant features were exposed, principally in the area of the Old Bursary at the south end of the Great Quadrangle's South Range. The removal of modern plaster showed that one wall was a partially-surviving timber-framed partition which survived from the original construction of the college. Dendrochronology analysis showed that the main timbers were from trees felled in 1474 which corresponds with documentary evidence showing that construction of the chapel, in the west half of the south range, also began in 1474. Four studs survive from this partition as well an almost entire head rail and approximately half of the sole plate.

Primary floor joists also survive in this area, either side of the partition, although modifications were undertaken in the mid 20th century to replace some principal members with steel beams. Another partition was exposed in the Old Bursary area which was dated by dendrochronology to 1583 and this retained some historic plaster as well as a panel of wattle and daub.

The strip-out of the Chaplains III building provided evidence of its internal structure although previous works had removed the vast majority of the primary fabric. The formation of a doorway in the north wall showed that this part of the north wall included a number of reused moulded stones which had been set backwards with the flat side facing outwards.

APPENDIX C REPORT ON DENDROCHRONOLOGY ANALYSIS

Oxford Dendrochronology Laboratory
Report 2020/19

The Tree-Ring Dating of the Hall Floor and Undercroft, Magdalen College, Oxford

Dr D W H Miles FSA

Summary:

OXFORD, Magdalen College (SP 52113 06173), Hall

(a) Primary phase *Felling dates:* **Spring 1473** and **Spring 1474**

(b) Secondary partition below Hall *Felling date:* **Spring 1583**

(a) Joists (5/7) 1473(20¼C, 19¼C), 1472(21¼C), 1459(H/S), 1446(H/S), Stud 1473(20¼C), 1414; Partition head beam 1459(H/S); Axial beam 1443(H/S); (b) Partition stud 1582(17¼C); Door posts 1577(10), 1449; Door head(0/1). *Site Masters* (a) MAGDLN12 1327-1473 (*t* = 11.08 CCFARMHS; 9.71 BDLEIAN1; 9.18 BDLEIAN2); (b) MAGDLN13 1506-1582 (*t* = 8.43 MAGDALN7; 6.77 DSDPSQ01; 6.24 SCENG).

Although founded in 1458, the present site was not constructed until the 1470s on the acquisition of the suppressed Hospital of St John. Construction started on the Chapel and Hall range first, with the foundation stone to the former laid and blessed on the 5th of May 1474. Work continued until 14th November when stonework went up to window sill level. Most of the timber had been obtained from the royal forest of Shotover, but also obtained from Witney, Woodstock, and the royal forest of Wychwood. It is not thought that the Hall and Chapel were completed until the end of the 1470s (Brockless, L W B (ed) 2008 *Magdalen College Oxford – A History* ,p 23-4). Felling dates of spring 1473 and spring 1474 would suggest that the timber to the Hall floor frames and partitions to the ground floor below were obtained at this time. The excellent matches with timbers from Corpus Christi Farmhouse at Littlemore (south of Shotover) and from the Bodliean Library, which documented using timber from Shotover, makes this the most logical source for most of the timber. Dates of 1474 for the Muniment Tower and 1476 and 1477 for the adjacent State Rooms would suggest this these ranges were constructed at broadly the same time. This is summarised most fully in *VA* **49** (2018), p 143.

A precise date of spring 1583 (b) was produced for a later partition. This formed a small room off the northern end of the ground floor adjacent to the underside of the stairs leading to the Hall. In the 1900s this main room served as the SCR Smoking Room. Following the construction of the new Fellows Smoking Room between the Muniment Tower and Founders Tower in 1950s, the room served as a storeroom until being renovated in 2019/20. Archaeological recording by Oxford Archaeology and dating commissioned by the College Surveyor on behalf of the President and Fellows of Magdalen College, Oxford.

Date sampled: 17th December 2019

Owner & Commissioner: President and Fellows of Magdalen College

Historical Research: Jon Gill, Oxford Archaeology

Summary published: Miles, D H, and Bridge, M C, 2020 Tree-ring dates, *Vernacular Architecture* **51**, (forthcoming)

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July 2020

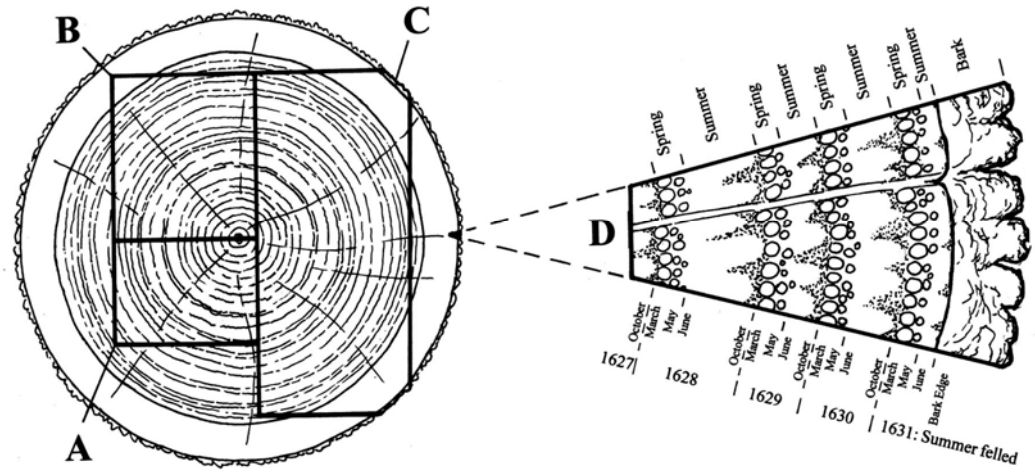
How Dendrochronology Works

Dendrochronology has over the past 30 years become one of the leading and most accurate scientific dating methods. Whilst not always successful, when it does work, it is precise, often to the season of the year. Tree-ring dating is well known for its use in dating historic buildings and archaeological timbers to this degree of precision. However more ancillary objects such as doors, furniture, panel paintings, and wooden boards in medieval book-bindings can sometimes be successfully dated.

The science of dendrochronology is based on a combination of biology and statistics. Fundamental to understanding how dendrochronology works is the phenomenon of tree growth. Essentially, trees grow through the addition of both elongation and radial increments. The elongation takes place at the terminal portions of the shoots, branches, and roots, while the radial increment is added by the cambium, the zone of living cells between the wood and the bark. In general terms, a tree can be best simplified by describing it as a cone, with a new layer being added to the outside each year in temperate zones, making it wider and taller.

An annual ring is composed of the growth which takes place during the spring and summer until about November when the leaves are shed and the tree becomes dormant for the winter period. For the European oak (*Quercus robur* and *Q. petraea*), as well as many other species, the annual ring is composed of two distinct parts - the spring growth or early wood, and the summer growth, or late wood. Early wood is composed of large vessels formed during the period of shoot growth which takes place between March and May, which is before the establishment of any significant leaf growth, and is produced by using most of the energy and raw materials laid down the previous year. Then, there is an abrupt change at the time of leaf expansion around May or June when hormonal activity dictates a change in the quality of the xylem and the summer, or late wood is formed. Here the wood becomes increasingly fibrous and contains much smaller vessels. Trees with this type of growth pattern are known as ring-porous, and are distinguished by the contrast between the open, light-coloured early wood vessels and the dense, darker-coloured late wood.

Dendrochronology utilises the variation in the width of the annual rings as influenced by climatic conditions common to a large area, as opposed to other more local factors such as woodland competition and insect attack. It is these climate-induced variations in ring widths that allow calendar dates to be ascribed to an undated timber when compared to a firmly-dated sequence which has shared a common period of growth with the sample being dated. If a tree section is complete to the bark edge, then when dated a precise date of felling can be determined. The felling date will be precise to the season of the year, depending on the degree of formation of the outermost ring. Therefore, a tree with bark which has the spring vessels formed but no summer growth can be said to have been felled in the spring, although it is not possible to say in which particular month the tree was felled.



Section of tree with conversion methods showing three types of sapwood retention resulting in **A** *terminus post quem*, **B** a felling date range, and **C** a precise felling date. Enlarged area **D** shows the outermost rings of the sapwood with growing seasons (Miles 1997, 42)

Another important consideration in dendrochronological studies is the presence (or absence) of sapwood. This is the band of growth rings immediately beneath the bark and comprises the living growth rings which transport the sap from the roots to the leaves. This sapwood band is distinguished

from the heartwood by the prominent features of colour change and the blocking of the spring vessels with tyloses, the waste products of the tree's growth. The heartwood is generally darker in colour, and the spring vessels are blocked with tyloses. The heartwood is dead tissue, whereas the sapwood is living, although the only really living, growing, cells are in the cambium, immediately beneath the bark. In European oak (*Quercus* spp), the difference in colour is generally matched by the change in the spring vessels. Generally the sapwood retains stored food and is therefore attractive to insect and fungal attack once the tree is felled and therefore is often removed during conversion.

Sapwood in European oaks tends to be of a relatively constant width and/or number of rings. By determining what this range is with an empirically or statistically-derived estimate is a valuable aspect in the interpretation of tree-ring dates where the bark edge is not present (Miles 1997). The narrower this range of sapwood rings, the more precise the estimated felling date range will be.

Methodology: The Dating Process

All timbers sampled were of oak (*Quercus* spp.) from what appeared to be primary first-use timbers, or any timbers which might have been re-used from an early phase. Those timbers which looked most suitable for dendrochronological purposes with complete sapwood or reasonably long ring sequences were selected. *In situ* timbers were sampled through coring, using a 16mm hollow auger. Details and locations of the samples are detailed in the summary table.

The dry samples were sanded on a linisher, or bench-mounted belt sander, using 60 to 1200 grit abrasive paper, and were cleaned with compressed air to allow the ring boundaries to be clearly distinguished. They were then measured under a x10/x30 microscope using a travelling stage electronically displaying displacement to a precision of 0.01mm. Thus each ring or year is represented by its measurement which is arranged as a series of ring-width indices within a data set, with the earliest ring being placed at the beginning of the series, and the latest or outermost ring concluding the data set.

The principle behind tree-ring dating is a simple one: the seasonal variations in climate-induced growth as reflected in the varying width of a series of measured annual rings is compared with other, previously dated ring sequences to allow precise dates to be ascribed to each ring. When an undated sample or site sequence is compared against a dated sequence, known as a reference chronology, an indication of how good the match is must be determined. Although it is almost impossible to define a visual match, computer comparisons can be accurately quantified. Whilst it may not be the best statistical indicator, a variant of the Student's (a pseudonym for W S Gosset) *t*-value has been widely used amongst British dendrochronologists. The cross-correlation algorithms most commonly used and published are derived from Baillie and Pilcher's CROS programme (Baillie and Pilcher 1973), although a faster version (Munro 1984) giving slightly different Baillie-Pilcher *t*-values is sometimes used for indicative purposes.

Generally, *t*-values over 3.5 should be considered to be significant, although in reality it is common to find demonstrably spurious t-values of 4 and 5 because more than one matching position is indicated. For this reason, dendrochronologists prefer to see some *t*-value ranges of 5, 6, or higher, and for these to be well replicated from different, independent chronologies with local and regional chronologies well represented. Users of dates also need to assess their validity critically. They should not have great faith in a date supported by a handful of *t*-values of 3's with one or two 4's, nor should they be entirely satisfied with a single high match of 5 or 6. Examples of spurious *t*-values in excess of 7 have been noted, so it is essential that matches with reference chronologies be well replicated, and that this is confirmed with visual matches between the two graphs. Matches with *t*-values of 10 or more between individual sequences usually signify samples having originated from the same parent tree.

In reality, the probability of a particular date being valid is itself a statistical measure depending on the *t*-values. Consideration must also be given to the length of the sequence being dated as well as those of the reference chronologies. A sample with 30 or 40 years growth is likely to match with high *t*-values at varying positions, whereas a sample with 100 consecutive rings is much more likely to match significantly at only one unique position. Samples with ring counts as low as 50 may occasionally be dated, but only if the matches are very strong, clear and well replicated, with no other significant matching positions. This is essential for intra-site matching when dealing with such short sequences.

Consideration should also be given to evaluating the reference chronology against which the samples have been matched: those with well-replicated components which are geographically near to the sampling site are given more weight than an individual site or sample from the opposite end of the country.

It is general practice to cross-match samples from within the same phase to each other first, combining them into a site master, before comparing with the reference chronologies. This has the advantage of averaging out the 'noise' of individual trees and is much more likely to obtain higher *t*-values and stronger visual matches. After measurement, the ring-width series for each sample is plotted as a graph of width against year on log-linear graph paper. The graphs of each of the samples in the phase under study are then compared visually at the positions indicated by the computer matching and, if found satisfactory and consistent, are averaged to form a mean curve for the site or phase. This mean curve and any unmatched individual sequences are compared against dated reference chronologies to obtain an absolute calendar date for each sequence. Sometimes, especially in urban situations, timbers may have come from different sources and fail to match each other, thus making the compilation of a site master difficult. In this situation samples must then be compared individually with the reference chronologies.

Therefore, when cross-matching samples with each other or against reference chronologies, a combination of both visual matching and a process of qualified statistical comparison by computer is used. The ring-width series were compared on an IBM compatible computer for statistical cross-matching using a variant of the Belfast CROS program (Baillie and Pilcher 1973). A version of this and other programmes were written in BASIC by D Haddon-Reece, and re-written in Microsoft Visual Basic by M R Allwright and P A Parker.

Ascribing and Interpreting Felling Dates

Once a tree-ring sequence has been firmly dated in time, a felling date, or date range, is ascribed where possible. For samples which have sapwood complete to the underside of, or including bark, this process is relatively straightforward. Depending on the completeness of the final ring, i.e. if it has only the early wood formed, or the latewood, a *precise felling date and season* can be given. If the sapwood is partially missing, or if only a heartwood/sapwood transition boundary survives, then an *estimated felling date range* can be given for each sample. The number of sapwood rings can be estimated by using a statistically derived sapwood estimate with a given confidence limit. A review of the geographical distribution of dated sapwood data from historic building timbers has shown that a 95% range of 9-41 rings is most appropriate for the southern counties of England (Miles 1997), which will be used here. If no sapwood or heartwood/sapwood boundary survives, then the minimum number of sapwood rings from the appropriate sapwood estimate is added to the last measured ring to give a *terminus post quem* (*tpq*) or *felled after* date.

Some caution must be used in interpreting solitary precise felling dates. Many instances have been noted where timbers used in the same structural phase have been felled one, two, or more years apart. Whenever possible, a *group* of precise felling dates should be used as a more reliable indication of the *construction period*. It must be emphasised that dendrochronology can only date when a tree has been felled, not when the timber was used to construct the structure under study. However, it is common practice to build timber-framed structures with green or unseasoned timber and that construction usually took place within twelve to eighteen months of felling (Miles 2006).

Details of Dendrochronological Analysis

The results of the dendrochronological analysis for the building under study are presented in a number of detailed tables. The most useful of these is the summary **Table 1**. This gives most of the salient results of the dendrochronological process, and includes details for each sample, its location, and its felling date or date range, if successfully tree-ring dated. This last column is of particular interest to the end user, as it gives the actual year and season when the tree was felled, if the final ring is present, or an estimated felling date range if the sapwood is incomplete. Occasionally it will be noted that the felling date ranges may not coincide with the precise felling dates. This is nothing to be overly concerned about so long as these are not too far apart. It must be remembered that the estimated felling date ranges

are calculated at a 95% confidence level, which means that statistically one sample in 20 will have felling dates which actually fall *outside* the predicted range.

It will also be noticed that often the precise felling dates will vary within several years of each other. Unless there is supporting archaeological evidence suggesting different phases, all this would indicate is either stockpiling of timber, or of trees which have been felled or died at varying times but not cut up until the commencement of the particular building operations in question. When presented with varying precise felling dates, one should always take the *latest* date for the structure under study, and it is likely that construction will have been completed for ordinary vernacular buildings within twelve or eighteen months from this latest felling date (Miles 1997).

Table 2 gives an indication of the statistical reliability of the match between one sequence and another. This shows the *t*-value over the number of years overlap for each combination of samples in a matrix table. It should be borne in mind that *t*-values with less than 80 rings overlap may not truly reflect the same degree of match and that spurious matches may produce similar values.

First, multiple radii have been cross-matched with each other and combined to form same-timber means. These are then compared with other samples from the site and any which are found to have originated from the same parent tree are again similarly combined. Finally, all samples, including all same timber and same tree means are combined to form one or more site masters. Again, the cross-matching is shown as a matrix table of *t*-values over the number of years of overlap. Reference should always be made to **Table 1** to clearly identify which components have been combined.

Table 3 shows the degree of cross-matching between the site master(s) with a selection of reference chronologies. This shows the county or region from which the reference chronology originated, the common chronology name together with who compiled the chronology, a publication reference and the years covered by the reference chronology. The number of years overlap of the reference chronology and the site master being compared are also shown together with the resulting *t*-value. It should be appreciated that well-replicated regional reference chronologies, which are shown in **bold**, will often produce better matches than with individual site masters or indeed individual sample sequences.

Figures include a bar diagram which shows the chronological relationship between two or more dated samples from a phase of building. The site sample record sheets are also appended, together with any plans showing sample locations, if available.

Publication of dated sites are published in *Vernacular Architecture* annually, and the entry, if available, is shown on the summary page of the report. This does not give as much technical data for the samples dated, but does give the *t*-value matches against the relevant chronologies, provide a short descriptive paragraph for each building or phase dated, and gives a useful short summary of samples dated. These summaries are also listed on the web-site maintained by the Laboratory, which can be accessed at `www.Oxford-dendroLab.com`. The Oxford Dendrochronology Laboratory retains copyright of this report, but the commissioner of the report has the right to use the report for his/her own use so long as the authorship is quoted. Primary data and the resulting site master(s) used in the analysis are available from the Laboratory on request by the commissioner and *bona fide* researchers. The samples form part of the Laboratory archives.

Summary of Dating

Repairs and renovations were being carried out to the Senior Common Room and other adjacent rooms beneath the Hall. Archaeological recording by Jon Gill of Oxford Archaeology identified the need to accurately date four elements of historic construction: the ceiling of two bays under the east end of the Hall, a partition at the west end of these bays, a ceiling to the west of this partition up to the stone vault supporting the original hearth to the Hall above, and a later partition to the north side of the eastern bay (1) adjacent to the staircase leading up to the Hall.

It was thought that the first three elements might be all coeval, and surviving from the primary construction phase of the College, and the last partition clearly a later phase. Therefore sampling was spread over the first three areas on this assumption, and if the dating proved inconclusive, then further sampling would be considered.

The samples were then taken on the above basis which included five joists and main beam from the first two bays of floor (**mco151** – **mco155**), three joists from the third bay beyond the partition (**mco156** – **mco158**), three timbers from the partition (**mco159** – **mco161**), and four timbers from the secondary partition in Bay 2 (**mco162** – **mco165).** Including secondary samples taken to obtain bark edge, a total of 20 samples were taken from 15 timbers.

First, all multiple samples taken from individual timbers were compared with each other and if found to be matching satisfactorily, were combined to form same timber means. Thus, **mco151a** and **mco151b** were combined to form the mean **mco151**, **mco153a** and **153b** were combined to form the mean **mco153**, **mco154a** and **mco154b** combined to form **mco154**, **mco161a** and **mco161b** to **mco161**, and **mco162a** and **mco162b** to form **mco162** (Table 2). These same timber means were taken through to the next stage of the analysis.

Next, all timber sequences were compared with each other and two same-tree means were identified: Timbers **mco154** and **mco155** were compared with each other and combined to form the same-tree mean **mco1545**. Similarly **mco160** and **mco161** were combined to form the mean **mco16061** (Table 2). These were then taken to the next stage of the analysis.

The individual timber and tree mean sequences were then compared with each other and seven representing nine timbers were combined to form the 147-ring site master **MAGDLN12** (Table 2).

This was then compared with the reference chronologies and was found to match strongly and conclusively, spanning the years 1327-1473 (Table 3a). Best matches were from local Oxford chronologies, but surprisingly not so well with the virtually coeval chronology from the State Rooms and Muniment Tower.

From the secondary partition, two timbers were found to match together and were combined to form the 77-ring site master **MAGDLN13**. This was also compared with the reference chronologies and found to date equally strongly, spanning the years 1506-1582 (Table 3b). The best match was with the site master **MAGDALN7**, beams from the Great Tower, replaced in 1630.

One additional timber, **mco163** did not match the other components of **MAGDLN13**, but was dated independently, spanning the years 1316-1449. This timber finished over 50 years earlier than the earliest timber in the site master, having originated from a large slow-growing tree. The highest five matches against individual site masters were from the Burford area: t = 8.81 with **BURFORD2**, t = 8.39 with **BURFORD6**, and t = 7.88 with **BURFORD4**, as well as t = 7.59 with **PEBBLE** and **MANORFM** both from neighbouring Swinbrook. It is therefore likely that this timber originated from this area.

Interpretation

Of the 15 timbers sampled, 12 were dated conclusively. Of these, five retained bark edge, allowing precise felling dates to be determined. From the middle bay of ceiling, two precise felling dates of **spring 1474** were found for joists **mco153** and **mco154**, plus a precise date of **spring 1473** for a joist in the third or western bay (**mco158**). A felling date of **spring 1474** was also found for the primary partition stud **mco161**.

Two other timbers did not retain bark edge, but were found to have originated from parent trees which had been dated through other components with bark edge. Joist **mco155** was therefore also found to have been felled in **spring 1474** like **mco154**. Similarly partition stud **mco160** was also found to have been felled in **spring 1474** as was **mco161**.

Three other timbers produced felling date ranges of 1452-84, 1455-87, and 1468-1500 for samples **mco151**, **mco152**, and **mco159** respectively. These are all entirely consistent with the 1573-4 precise felling dates reported above.

A secondary partition stud (**mco162**) was found to have been felled in **spring 1583**. One door post (**mco163**) had no H/S boundary, but was felled after 1458, and the other door post (**mco164**) was felled between 1578-1608. It is quite likely that the first door post was from the inner part of the tree and the second post from the outermost section, the tree being over 200 years old.

Given the cluster of precise date of **spring 1474** for both sections of ceiling and the primary partition, it is quite clear that this is surviving primary fabric. This correlates well with the documented laying of the foundation stone on the 5th of May 1474. This is the first part of the College to be built, and the single outliner of **spring 1473** was probably a windfall or left over from some other building. It was clear however that at about the same time as the foundations were being begun, timber was being felled, and the ceiling timbers having been worked and prefabricated together were set in place later in the autumn, shortly before the stonework reached the window sill level to the Hall and Chapel on the 14th of November 1474. It is unusual to be able to correlate so closely documentary construction dates with dendrochronological dates, and much is learnt about the procurement of timber in co-ordination with the stonework. The excellent matches of chronologies from around Shotover (Littlemore and the Bodliean Library) suggests that much of the timber was obtained from this source (Brockless 2008).

A single date of **spring 1583** for a partition and doorway forming a small room at the northern end of the ground floor represents an unknown phase of work in the College. With a single precise date, it is quite possible that the actual construction date could be either in the middle of 1583, or within a year or two later.

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Table 1: Summary of Tree-Ring Dating

THE HALL, MAGDALEN COLLEGE, OXFORD

Sample number & type		Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens mm	Felling seasons and dates/date ranges (AD)
Hall floor										
mco151a	c	S E axial beam Bay 1	1334-1430			97	1.56	0.93	0.274	
mco151b	c	ditto	1336-1443	1443	H/S	108	1.32	0.88	0.245	
* **mco151**		Mean of **mco151a + mco151b**	1336-1443	1443	H/S	108	1.46	0.84	0.236	1452-84
* **mco152**	c	6th joist from E, S side Bay 2	1327-1446	1446	H/S	120	1.27	0.81	0.242	1455-87
mco153a	c	7th joist from E, S side Bay 2	1359-1472	1454	18	114	1.47	0.83	0.255	
mco153b	c	ditto	1392-1473	1452	21¼C	82	1.12	0.44	0.216	
* **mco153**		Mean of **mco153a + mco153b**	1359-1473	1453	20¼C	115	1.41	0.79	0.234	Spring 1474
mco154a	c	4th joist from E, middle Bay 2	1384-1457	1452	5	74	2.15	1.08	0.257	
mco154b	c	ditto	1408-1473	1456	17¼C	66	2.39	0.89	0.227	
mco154		Mean of **mco154a + mco154b**	1384-1473	1454	19¼C	90	2.24	0.95	0.255	Spring 1474
mco155	c	6th joist from E, middle Bay 2	1390-1459	1459	H/S	70	2.42	0.91	0.257	(Spring 1474)
* **mco1545**		Same-tree mean **mco154 + mco155**	1384-1473	1457	16¼C	90	2.27	0.90	0.254	Spring 1474
mco156	c	1st joist from E, middle Bay 3	-		27¼C	127	1.36	1.07	0.297	
mco157	c	2nd joist from E, middle Bay 3	-		21¼C	131	1.09	0.71	0.249	
* **mco158**	c	4th joist from E, middle Bay 3	1344-1472	1451	21¼C	129	1.42	0.49	0.266	Spring 1473
Primary Partition between Bay 2 and Bay 3										
* **mco159**	c	Partition head beam	1341-1459	1459	H/S	119	1.34	0.54	0.178	1468-1500
mco160	c	S stud partition	1334-1414			81	1.54	0.77	0.266	(Spring 1474)
mco161a	c	N stud partition	1365-1473	1452	21¼C	109	1.43	0.92	0.229	
mco161b	c	ditto	1417-1473	1454	19¼C	57	1.80	0.65	0.248	
mco161		Mean **mco161a + mco161b**	1365-1473	1453	20¼C	109	1.53	0.91	0.230	Spring 1474
* **mco16061**		Same tree mean **mco160 + mco161**	1334-1473	1453	20¼C	140	1.63	0.78	0.249	Spring 1474
*** = MAGDLN12 Site Master**			**1327-1473**			**147**	**1.61**	**0.59**	**0.182**	**1574**

Key: * = sample included in site-master; c = core; ¼C = bark edge present, partial or complete ring: ¼C = spring (last partial ring not measured);
H/S bdry = heartwood/sapwood boundary - last heartwood ring date; std devn = standard deviation; mean sens = mean sensitivity

Table 1: Summary of Tree-Ring Dating (continued)

Sample number & type		Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens mm	Felling seasons and dates/date ranges (AD)
Hall undercroft										
Secondary Partition and Doorway, Bay 1										
mco162a	c	E partition stud	1506-1582	1565	17¼C	77	1.64	0.58	0.203	
mco162b	c	ditto	1539-1582	1565	17¼C	44	1.63	0.42	0.197	
* **mco162**		Mean of **mco162a + mco162b**	1506-1582	1565	17¼C	77	1.61	0.57	0.205	Spring 1583
mco163	c	E door post	1316-1449			134	1.34	0.61	0.214	After 1458
* **mco164**	c	W door post	1510-1577	1567	10	68	1.62	0.57	0.214	1578-1608
mco165	c	Door head / transom	-			53	1.96	0.66	0.181	
*** = MAGDLN13 Site Master**			**1506-1582**			**77**	**1.66**	**0.54**	**0.197**	**1583**

Key: * = sample included in site-master; c = core; ¼C = bark edge present, partial or complete ring: ¼C = spring (last partial ring not measured);
H/S bdry = heartwood/sapwood boundary - last heartwood ring date; std devn = standard deviation; mean sens = mean sensitivity

Explanation of terms used in Table 1

The summary table gives most of the salient results of the dendrochronological process. For ease in quickly referring to various types of information, these have all been presented in Table 1. The information includes the following categories:

Sample number: Generally, each site is given a two or three letter identifying prefix code, after which each timber is given an individual number. If a timber is sampled twice, or if two timbers were noted at time of sampling as having clearly originated from the same tree, then they are given suffixes '**a**', '**b**', etc. Where a core sample has broken, with no clear overlap between segments, these are differentiated by a further suffix '**1**', '**2**', etc.

Type shows whether the sample was from a core 'c', or a section or slice from a timber's'. Sometimes photographs are used 'p', or timbers measured *in situ* with a graticule 'g'.

Timber and position column details each timber sampled along with a location reference. This will usually refer to a bay or truss number, or relate to compass points or to a reference drawing.

Dates AD spanning gives the first and last measured ring dates of the sequence (if dated),

H/S bdry is the date of the heartwood/sapwood transition or boundary (if present). This date is critical in determining an estimated felling date range if the sapwood is not complete to the bark edge.

Sapwood complement gives the number of sapwood rings. The tree starts growing in the spring during which time the earlywood is produced, also known also as spring growth. This consists of between one and three decreasing spring vessels and is noted as *Spring* felling and is indicated by a ¼ C after the number of sapwood ring count. Sometimes this can be more accurately pin-pointed to very early spring when just a few spring vessels are visible. After the spring growing season, the latewood or summer growth commences, and is differentiated from the proceeding spring growth by the dense band of tissue. This summer growth continues until just before the leaves drop, in about October. Trees felled during this period are noted as *summer* felled (½ C), but it is difficult to be too precise, as the width of the latewood can be variable, and it can be difficult to distinguish whether a tree stopped growing in autumn or *winter*. When the summer growth band is clearly complete, then the tree would have been felled during the dormant winter period, as shown by a single C. Sometimes a sample will clearly have complete sapwood, but due either to slight abrasion at the point of coring, or extremely narrow growth rings, it is impossible to determine the season of felling.

Number of rings: The total number of measured rings present on the samples analysed.

Mean ring width: This, simply put, is the sum total of all the individual ring widths, divided by the number of rings, giving an average ring width for the series.

Mean sensitivity: A statistic measuring the mean percentage, or relative, change from each measured yearly ring value to the next; that is, the average relative difference from one ring width to the next, calculated by dividing the absolute value of the differences between each pair of measurements by the average of the paired measurements, then averaging the quotients for all pairs in the tree-ring series (Fritts 1976). Sensitivity is a dendrochronological term referring to the presence of ring-width variability in the radial direction within a tree which indicates the growth response of a particular tree is "sensitive" to variations in climate, as opposed to complacency.

Standard deviation: The mean scatter of a population of numbers from the population mean. The square root of the variance, which is itself the square of the mean scatter of a statistical population of numbers from the population mean. (Fritts 1976).

Felling seasons and dates/date ranges is probably the most important column of the summary table. Here the actual felling dates and seasons are given for each dated sample (if complete sapwood is present). Sometimes it will be noticed that often the precise felling dates will vary within several years of each other. Unless there is supporting archaeological evidence suggesting different phases, all this would indicate is either stockpiling of timber, or of trees which have been felled or died at varying times but not cut up until the commencement of the particular building operations in question. When presented with varying precise felling dates, one should always take the *latest* date for the structure under study, and it is likely that construction will have been completed for ordinary vernacular buildings within twelve or eighteen months from this latest felling date (Miles 2006).

Felling date ranges are produced using an empirical estimates using the appropriate estimate (Miles 1997). However, these can sometimes be reduced using a new sapwood estimation methodology which uses the mean ring width, number of heartwood rings, known H/S boundary date, and the number of surviving sapwood rings, if present (Miles 2006). These are used after the empirical range and are shown in brackets (OxCal followed by date range). Combined felling date ranges for a phase of building is shown at the end of the phase to which it relates.

Table 2: Matrix of *t*-values and overlaps for same-timber means and site masters

Components of timber **mco151**

Sample:	**mco151b**
Last ring date AD:	1443
mco151a	9.31 97

Components of timber **mco153**

Sample:	**mco153b**
Last ring date AD:	1473
mco153a	10.58 81

Components of timber **mco154**

Sample:	**mco154b**
Last ring date AD:	1473
mco154a	11.08 50

Components of timber **mco162**

Sample:	**mco162b**
Last ring date AD:	1582
mco162a	17.86 44

Components of tree **mco1545**

Sample:	**mco155**
Last ring date AD:	1459
mco154	10.33 70

Components of timber **mco16061**

Sample:	**mco161**
Last ring date AD:	1473
mco160	5.81 50

Components of site master **MAGDLN12**

Sample:	**mco152**	**mco153**	**mco1545**	**mco158**	**mco159**	**mco16061**
Last ring date AD:	1446	1473	1473	1472	1459	1473
mco151	5.42 108	5.62 85	2.62 60	2.27 100	6.02 103	3.12 108
mco152		5.73 88	4.85 63	3.98 103	5.96 106	6.19 113
mco153			5.08 90	3.90 114	5.00 101	4.11 115
mco1545				2.86 89	3.21 76	3.01 90
mco158					2.29 116	4.13 129
mco159						3.18 119

Components of site master **MAGDLN13**

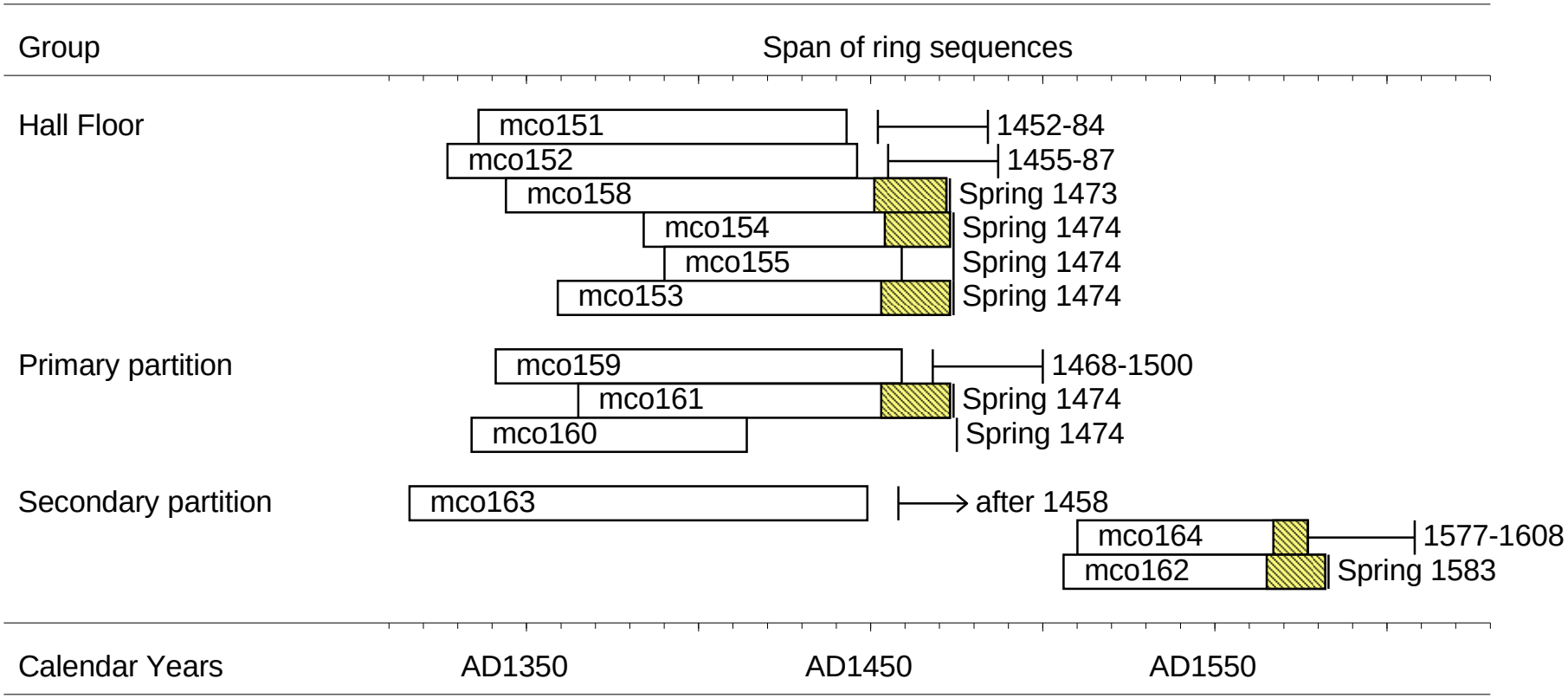
Sample:	**mco164**
Last ring date AD:	1577
mco162	12.49 68

Table 3a: Dating of site master **MAGDLN12** (1327-1473) against reference chronologies at 1473

County or region:	*Chronology name:*	*Short publication reference:*	*File name:*	*Spanning:*	*Overlap:*	t-*value:*
Berkshire	Hayley Green Farm, Warfield	(Miles and Worthington 2002)	HAYLYGRN	1338-1567	135	6.06
Shropshire	Whittington Castle	(Miles *et al* 2004)	WHITNGTN	1351-1628	123	6.17
Wiltshire	Saxon House, Malmsbury	(Miles *et al* 2003)	MALMSBRY	1304-1486	147	6.30
S Central England	South Central England	(Wilson *et al* 2012)	SCENG	663-2009	147	6.74
Berkshire	Song School, Windsor Castle	(Bridge and Miles 2016)	WINDSOR5	1316-1478	147	7.49
Oxfordshire	Bodleian Library	(Miles and Worthington 1999)	BDLEIAN2	1346-1485	128	9.18
Oxfordshire	Bodleian Library	(Miles and Worthington 1999)	BDLEIAN1	1322-1442	116	9.71
Oxfordshire	Corpus Christi Farmhouse	(Miles and Worthington 1999)	CCFARMHS	1311-1423	97	11.08

Table 3b: Dating of site master **MAGDLN13** (1506-1582) against reference chronologies at 1582

County or region:	*Chronology name:*	*Short publication reference:*	*File name:*	*Spanning:*	*Overlap:*	t-*value:*
Wiltshire	Salisbury Cathedral	(Miles 2005)	SARUM11	1409-1541	36	5.85
Hampshire	Church Cottage, Basingstoke	(Miles *et al* 2007)	BSNGSTK1	1364-1541	36	5.89
Oxfordshire	St John's College, Laudian Library	(Miles *unpubl*)	LAUDIAN	1525-1630	58	5.96
Oxfordshire	Bodleian Library	(Miles and Worthington 1999)	BDLEIAN4	1436-1570	65	6.17
S Central England	South Central England	(Wilson *et al* 2012)	SCENG	663-2009	77	6.24
London	Essex Lodge, Plaistow	(Bridge 1998)	esl11	1461-1580	75	6.61
Wiltshire	Dauntsey House, Dauntsey	(Hurford *et al* forthcoming)	DSDPSQ01	1393-1580	75	6.77
Oxfordshire	Magdalen College, Oxford	(Miles *et al* 2009)	MAGDALN7	1473-1629	77	8.43



Bar diagram showing dated timbers in chronological position

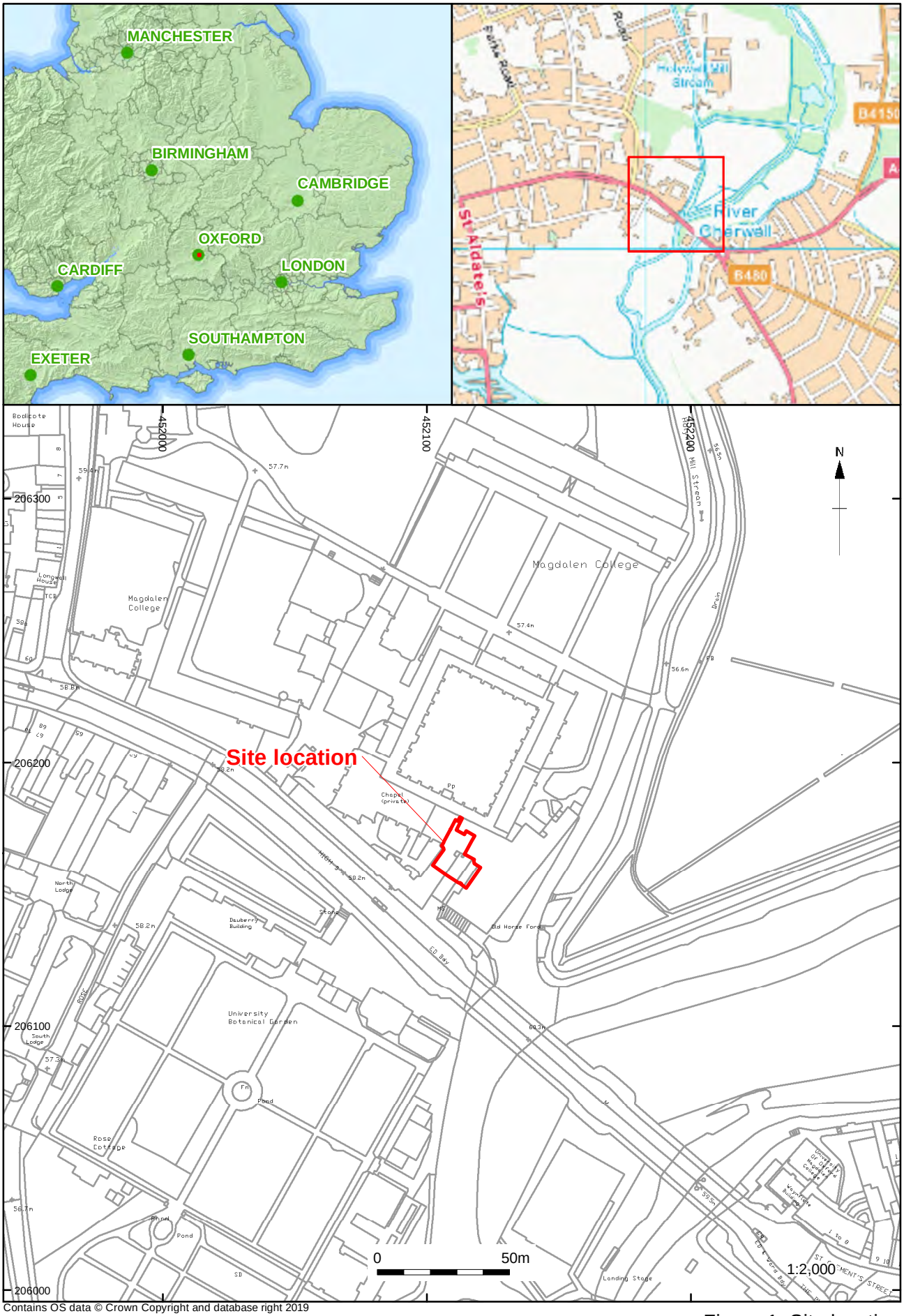
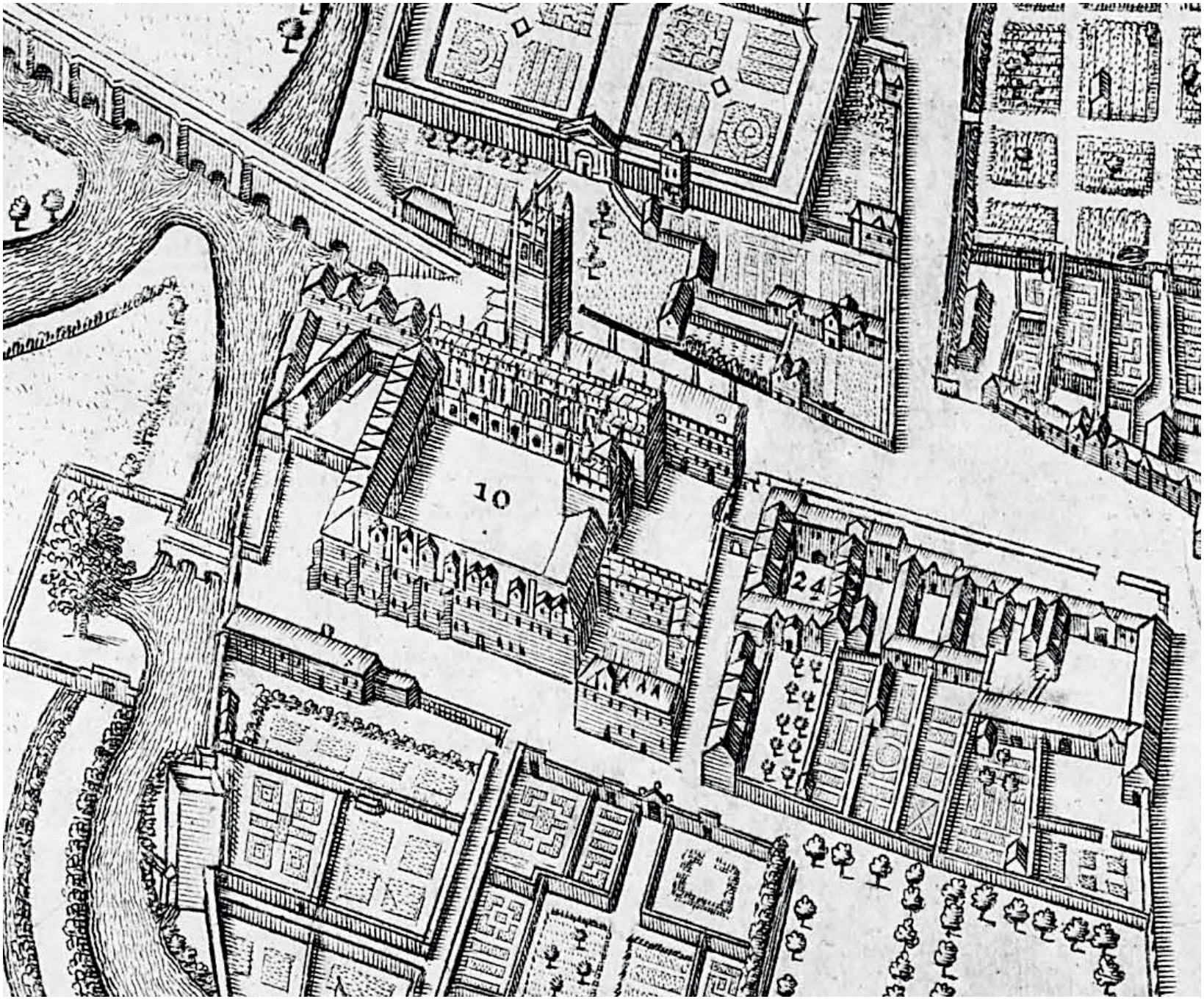
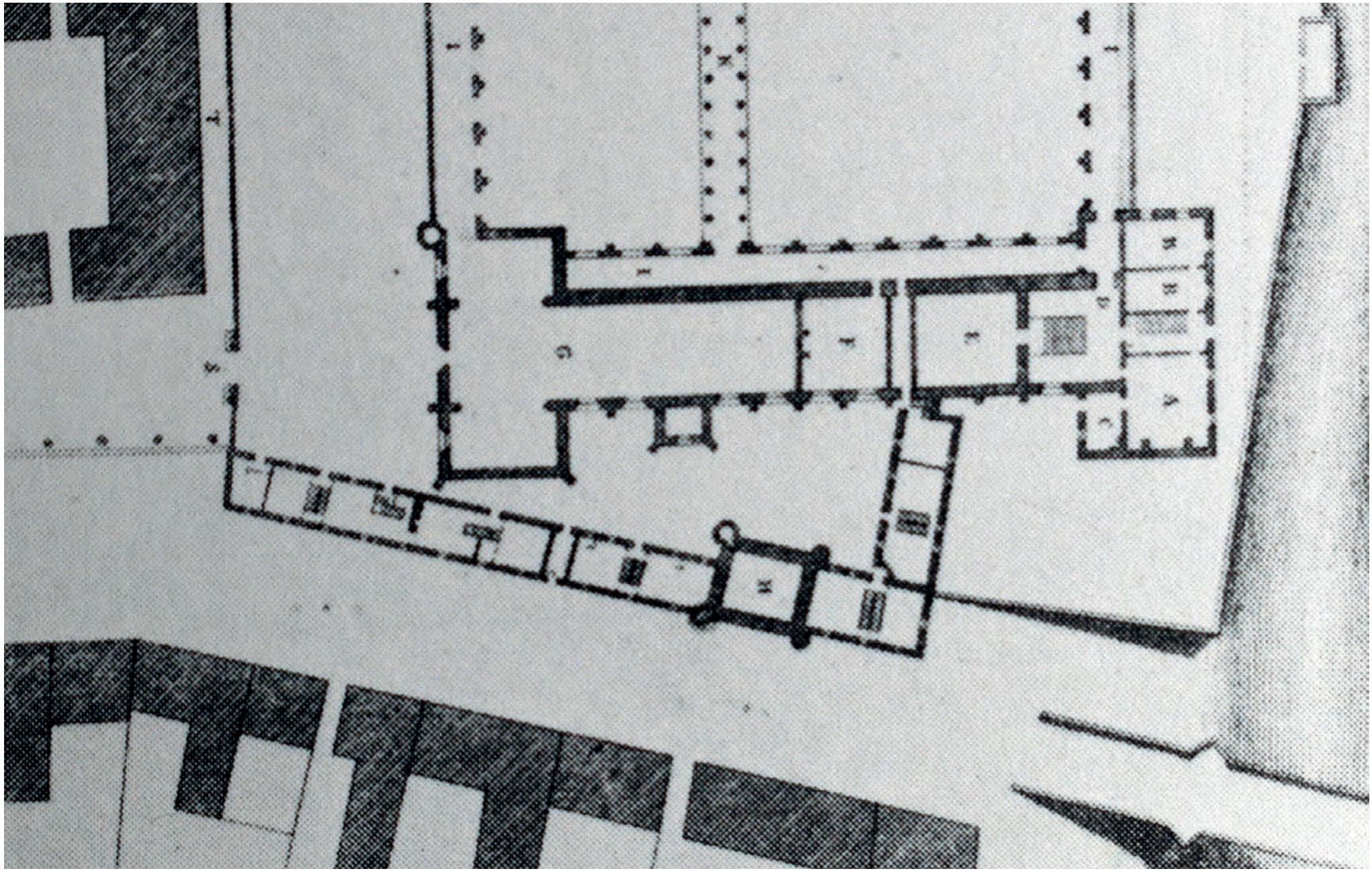


Figure 1: Site location



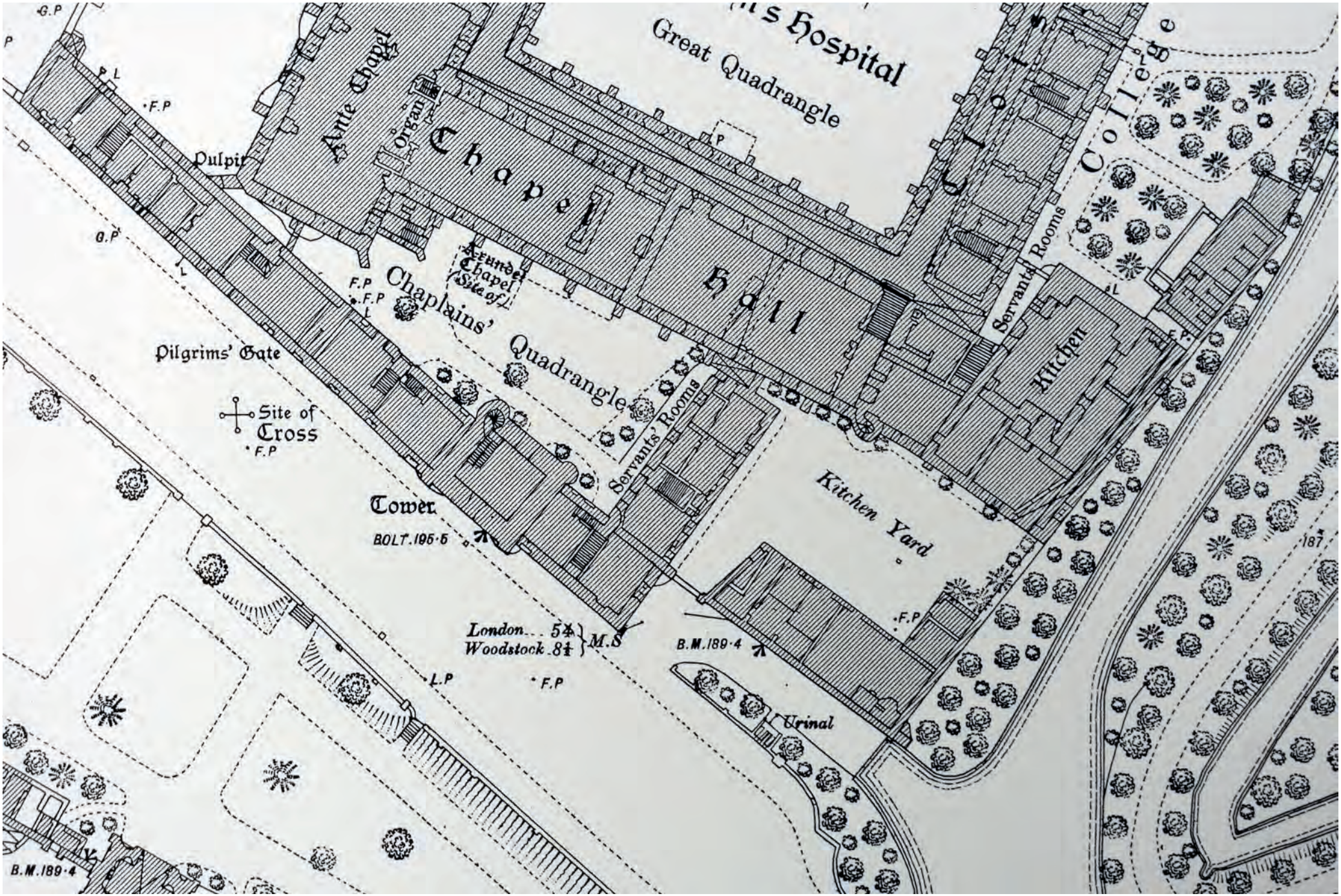
NOT TO SCALE

Figure 2: Extract from David Loggan's 1673 map of Oxford



NOT TO SCALE

Figure 3: Extract from Edward Holdsworth's c.1728 proposal for the New Building at Magdalen

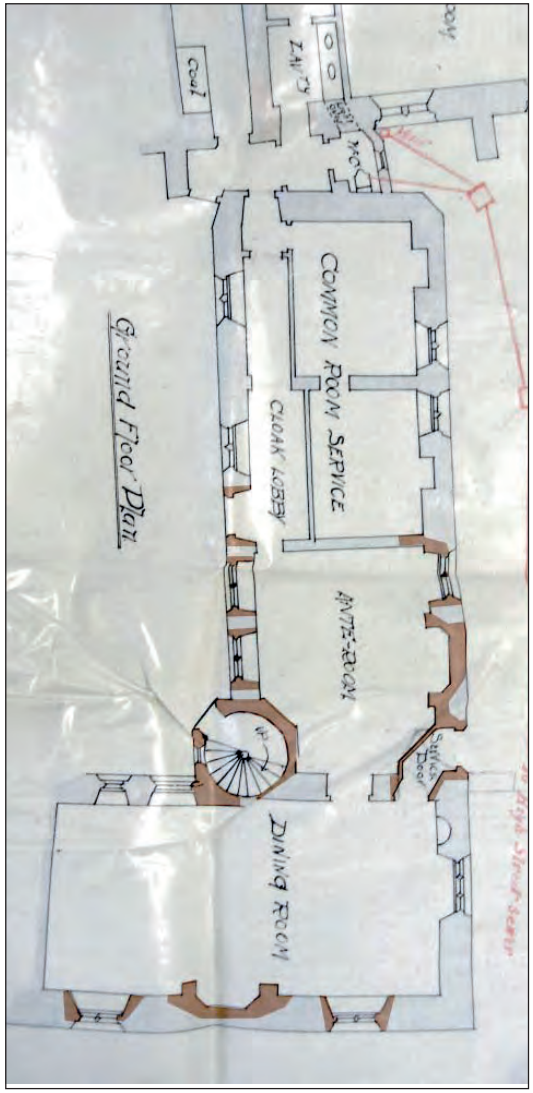


NOT TO SCALE

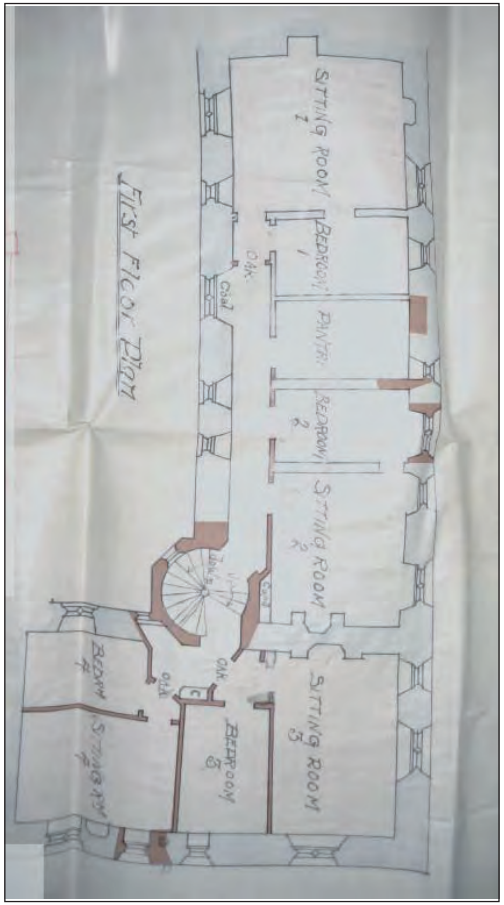
Figure 4: First edition Ordnance Survey Town Plan (1880)

1911 PLANS SHOWING MODIFICATIONS TO CHAPLAIN'S III

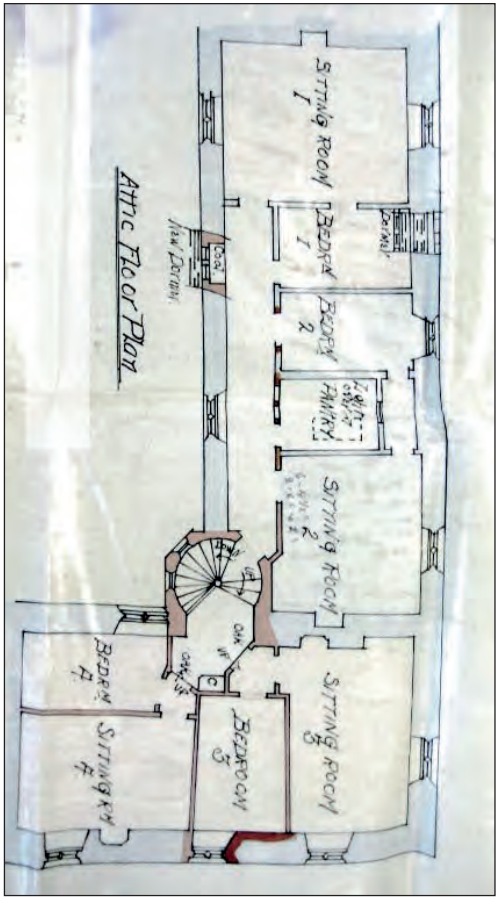
NOT TO SCALE



GROUND FLOOR PLAN

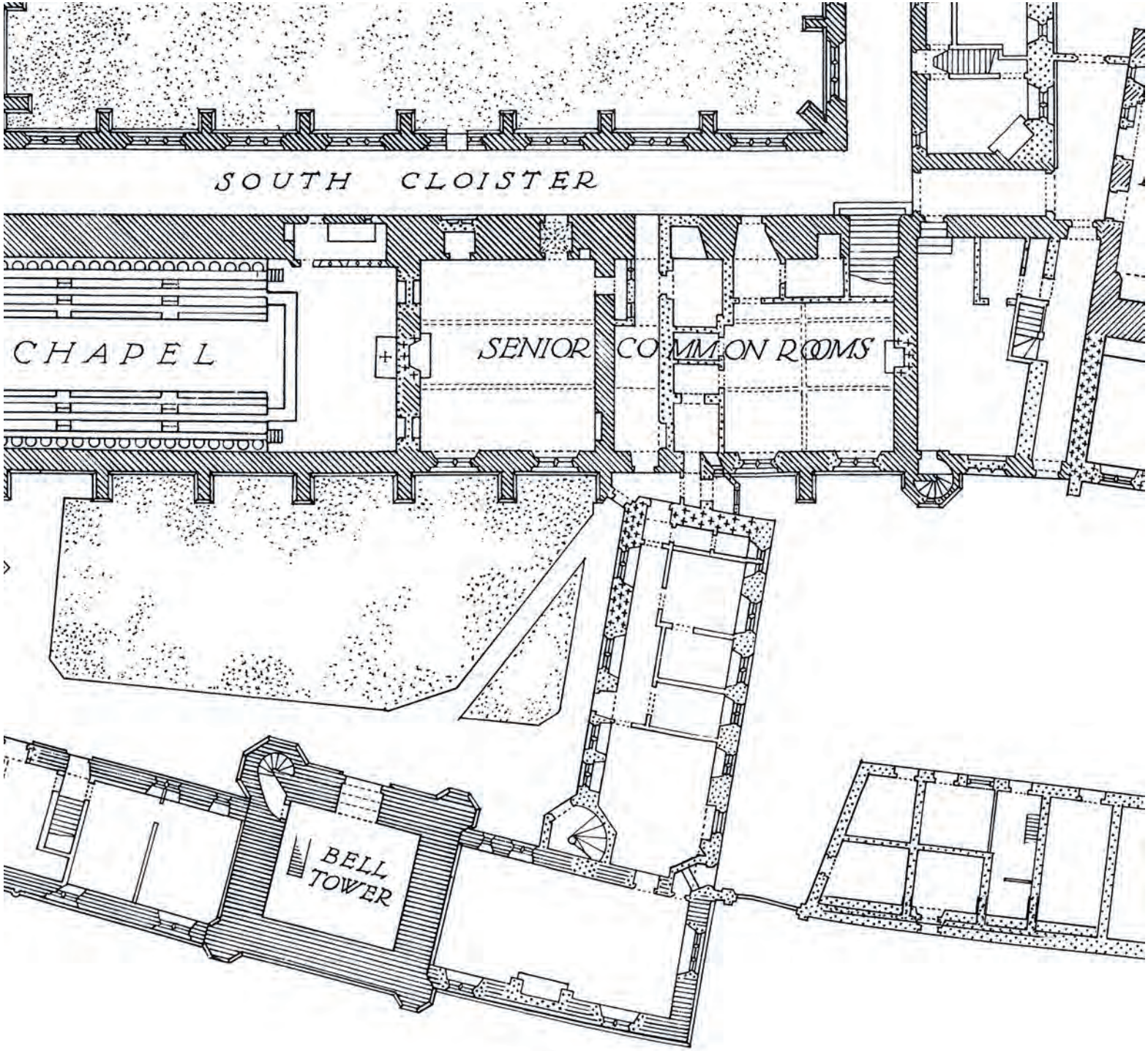


FIRST FLOOR PLAN



SECOND FLOOR PLAN

Figure 5: Plans from 1911 (from Oxford City Building Control)



NOT TO SCALE

Figure 6: Extract from Plan of Magdalen from RCHME Inventory of Oxford (1939)

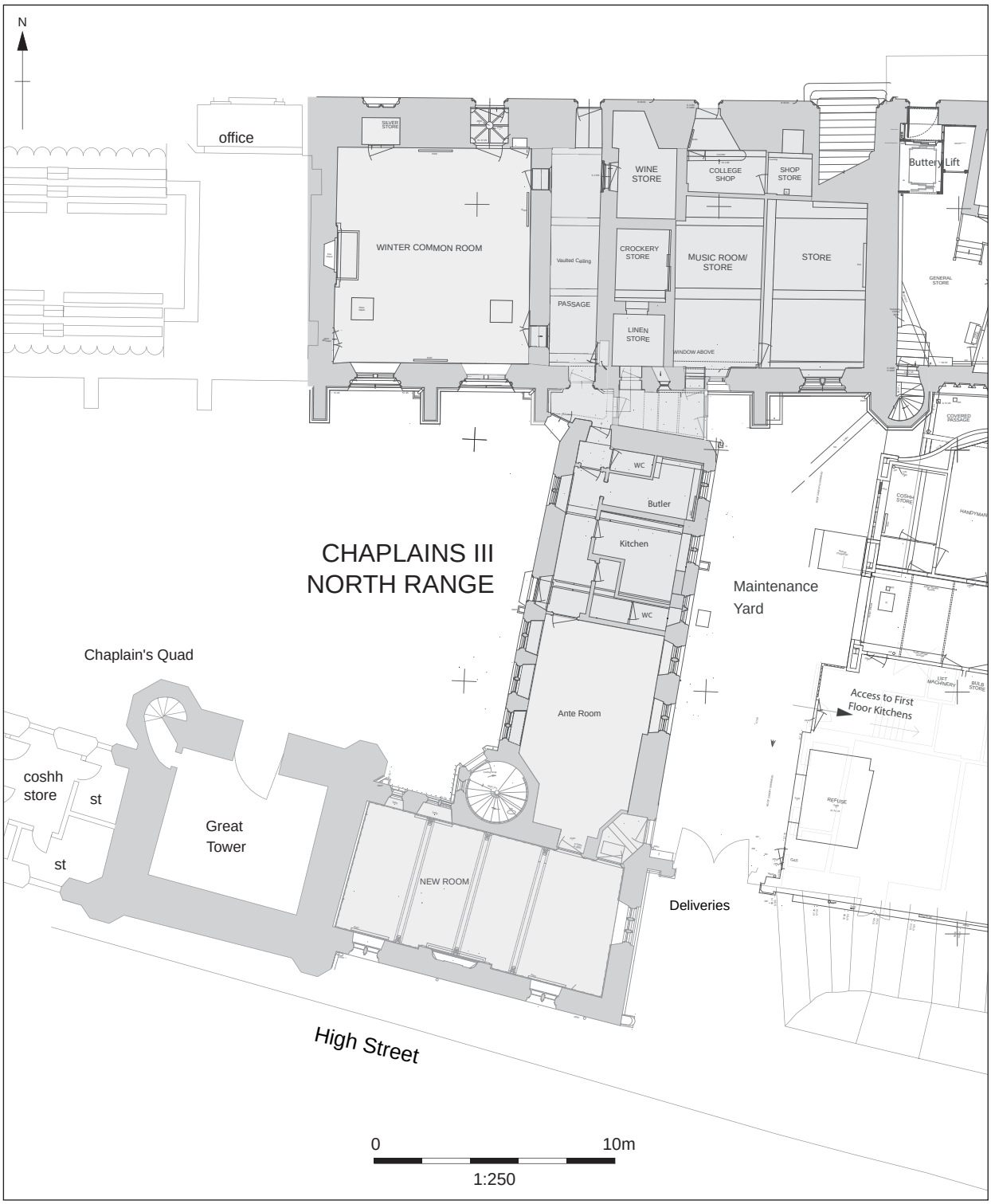


Figure 7: Ground floor plan of areas covered

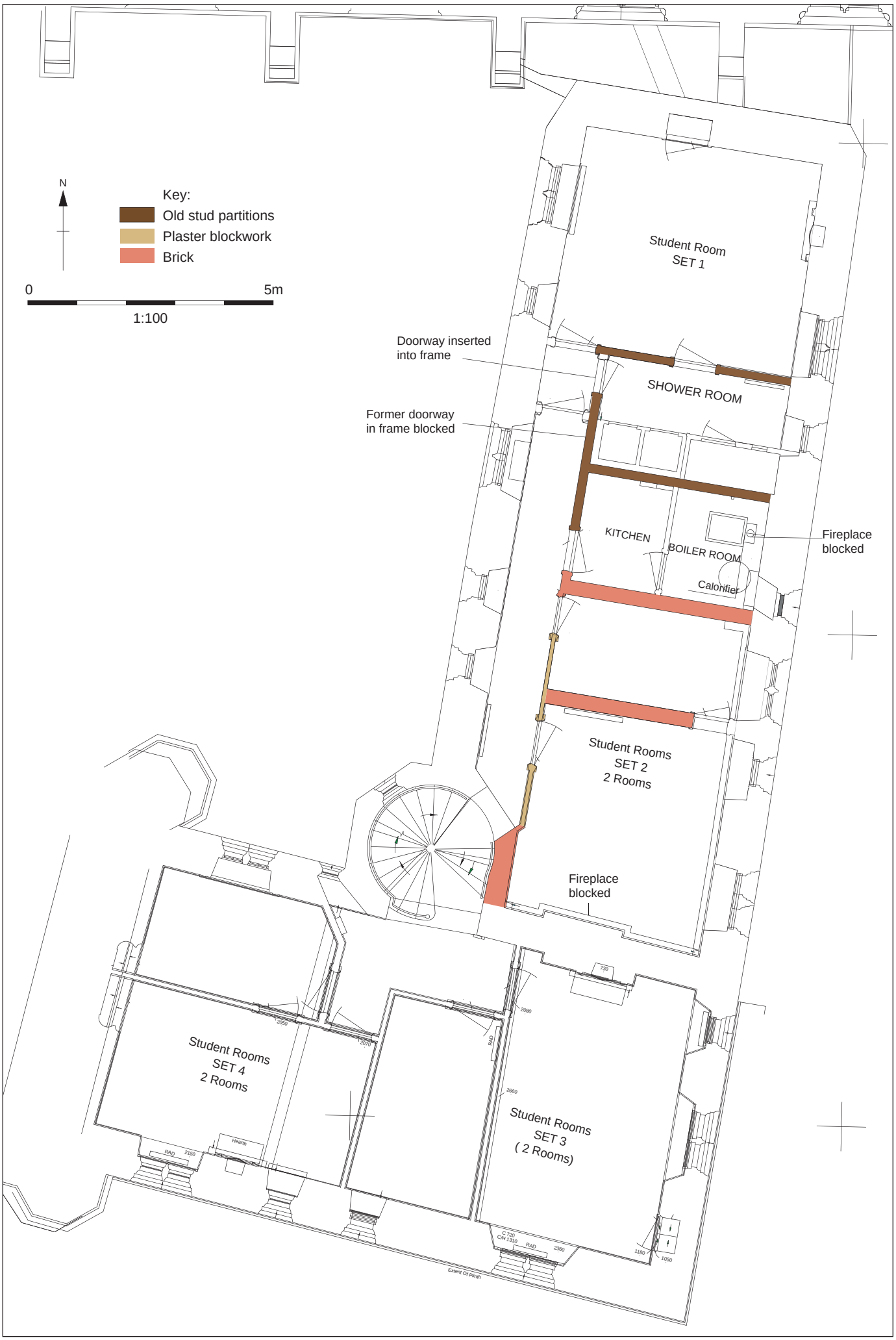


Figure 8: First floor plan of Chaplains III

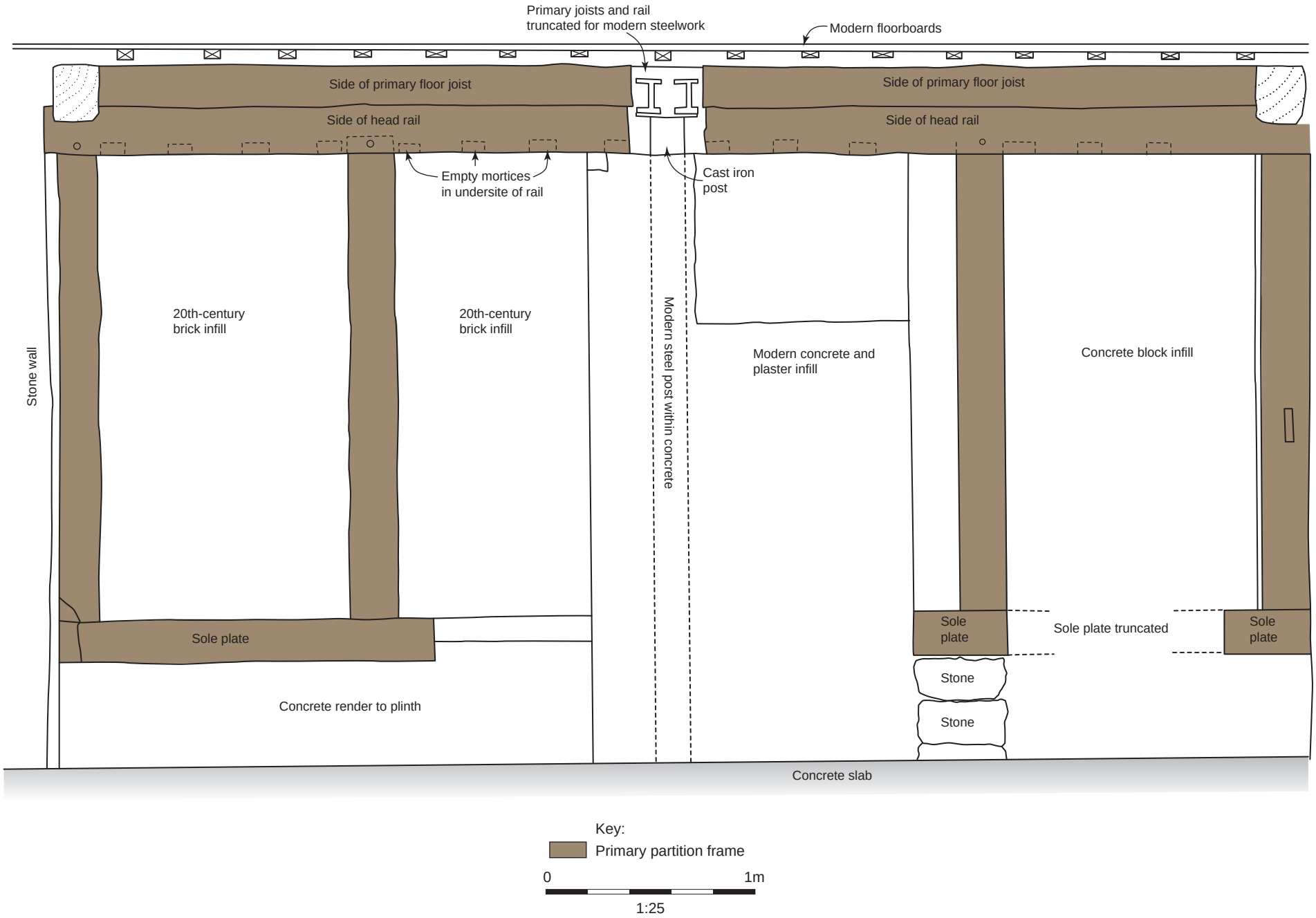


Figure 9: East elevation of Frame 1 (west side of Old Bursary)

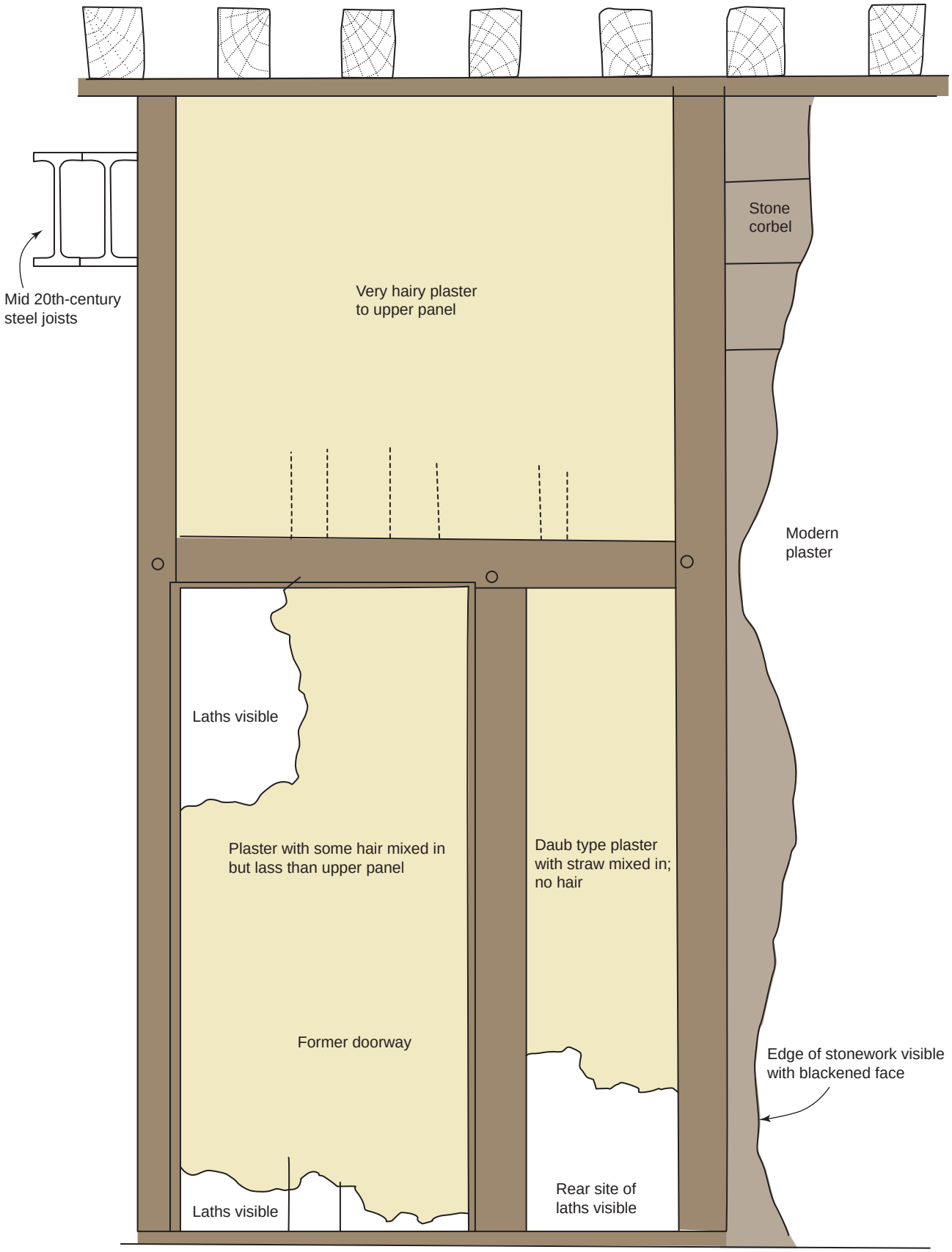


Figure 10: South elevation of Frame 2 (north side of Old Bursary).

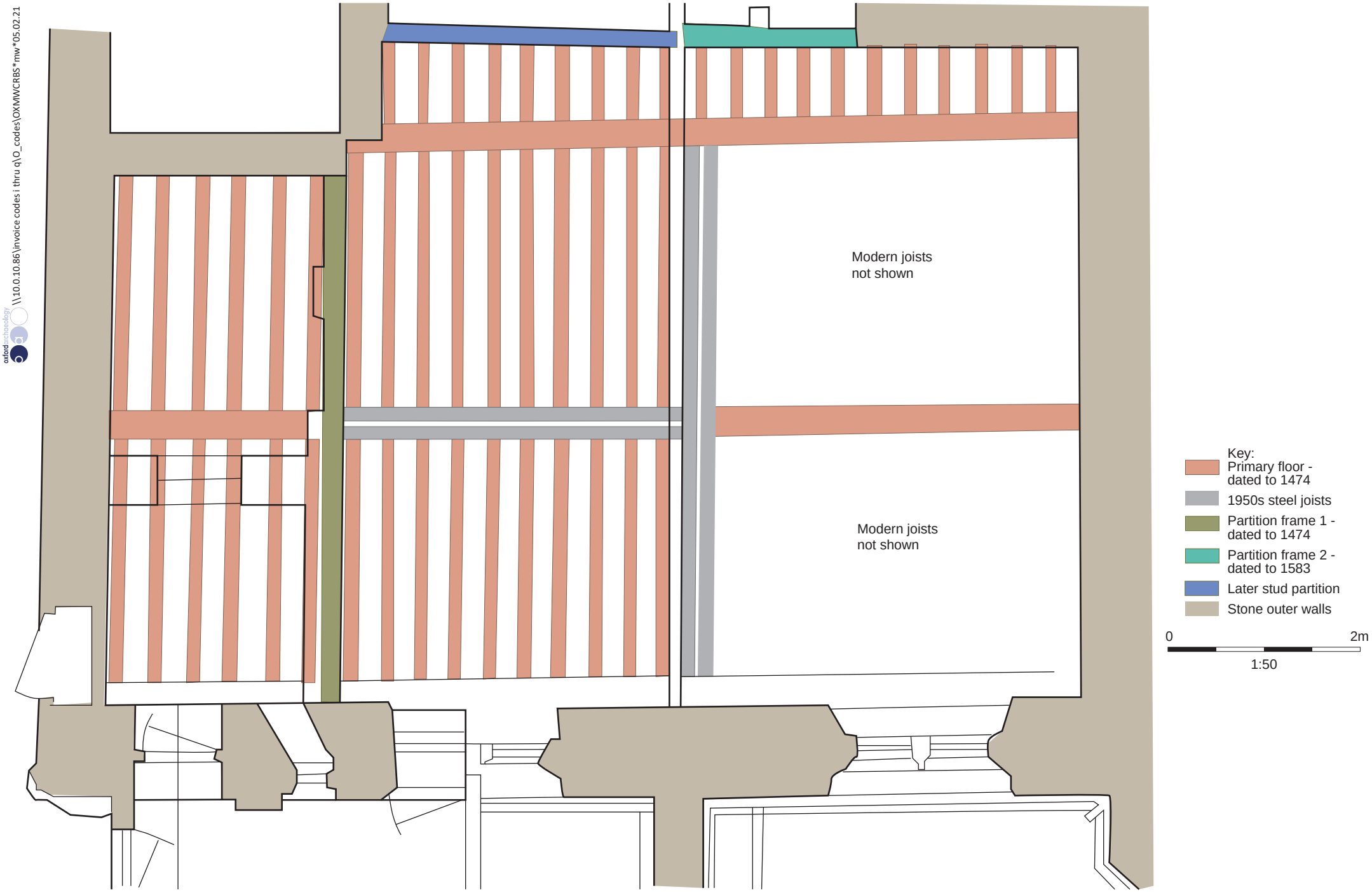


Figure 11: Plan of floor joists in Old Bursary area

Plate 1: Music Store in Old Bursary area prior to works looking west

Plate 2: Store in Old Bursary area prior to works looking north

Plate 3: Fireplace in Store in Old Bursary area

Plate 4: Store in Old Bursary area prior to work looking south

Plate 5: Winter Common Room prior to works

Plate 6: Passage between Winter Common Room and Old Bursary

Plate 7: Exposed frame in west wall of Old Bursary

Plate 8: South end of sole plate of frame in west side of Old Bursary

Plate 9: Sole plate of frame after removal of brick infill

Plate 10: Northern end of head rail

Plate 11: Northern half of partition

Plate 12: Fragment of sole plate on stone plinth

Plate 13: Partition on west side of Old Bursary after removal of infill

Plate 14: Sole plate

Plate 15: Underside of head rail showing empty mortices

Plate 16: North side of Old Bursary area during works

Plate 17: 16th century frame exposed on north side of Old Bursary

Plate 18: 16th century frame exposed on north side of Old Bursary

Plate 19: 16th century frame exposed on north side of Old Bursary

Plate 20: Base of 16th-century frame

Plate 21: 16th-century frame after works to raise it

Plate 22: Upper part of 16th-century frame after removal of plaster

Plate 23: Upper part of 16th-century frame after removal of plaster

Plate 24: Cast iron columns inserted in 1950s

Plate 25: Primary floor joists in Linen Store

Plate 26: Exposed floor in Old Bursary looking north-west

Plate 27: Exposed floor in Old Bursary looking east

Plate 28: Exposed floor in Old Bursary

Plate 29: Exposed floor in Linen/Crockery Store

Plate 30: Fragment of old floor in Old Bursary

Plate 31: Head of steel column at centre of primary partition

Plate 32: Old Bursary looking north after removal of partition

Plate 33: Fireplace on east side of Old Bursary after removal of surround

Plate 34: Passage to west of Old Bursary

Plate 35: Southern door in east wall of passage

Plate 36: northern door in east wall of passage

Plate 37: Passage after removal of servery

Plate 38: Passage during works to form doorway in east wall

Plate 39: Doorway being created in east wall of passage

Plate 40: New doorway created in east wall of passage

Plate 41: East face of doorway reopened at south end of passage

Plate 42: Section of floorboards lifted in Winter Common Room

Plate 43: Cobbled floor exposed beneath Winter Common Room

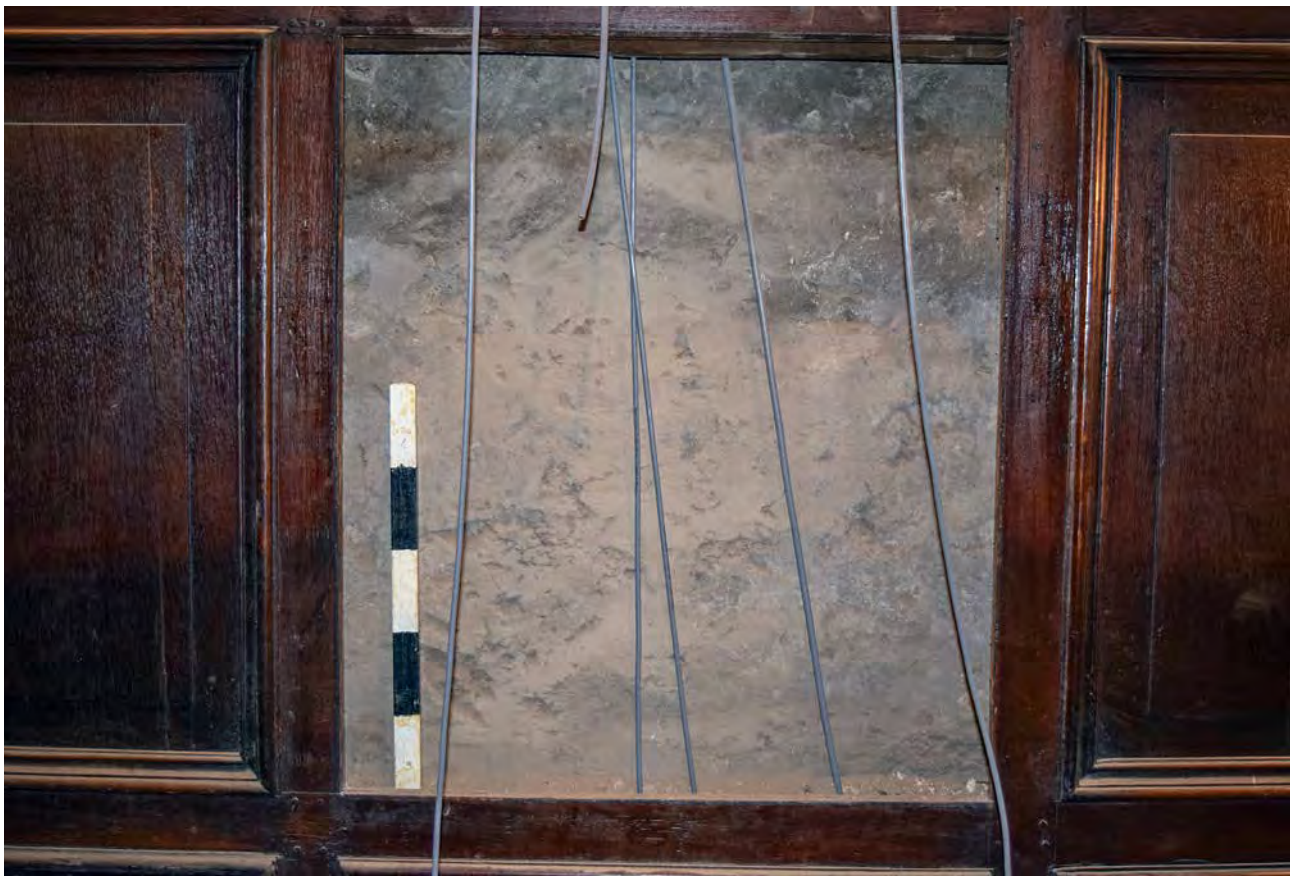


Plate 44: Exposed stone behind removed panel in Winter Common Room

Plate 45: South side of Great Quadrangle

Plate 46: Window in south wall of Hall

Plate 47: Window in south wall of Hall

Plate 48: Internal view of window in south wall of Hall

Plate 49: Lobby between Chaplains III and south side of Great Quad

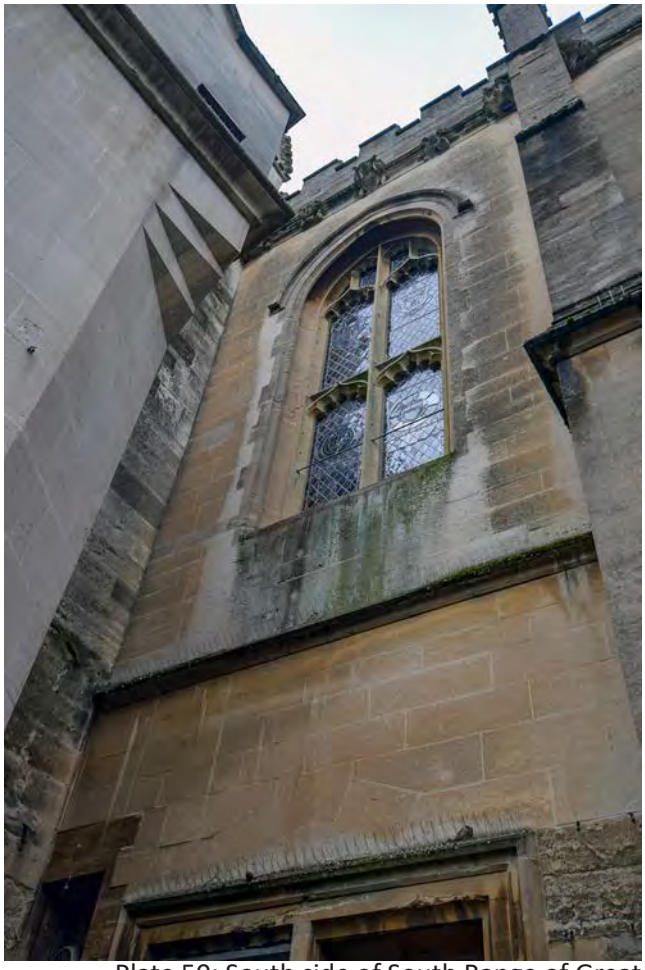


Plate 50: South side of South Range of Great Quadrangle

Plate 51: Works to doorway in South Range of Great Quad

Plate 52: Window in south side of South Range of Quadrangle

Plate 53: East side of Chaplains III

Plate 54: West side of Chaplains III

Plate 55: Inserted stair tower in Chaplains III

Plate 56: Ante Room in Chaplains III

Plate 57: Ante Room in Chaplains III

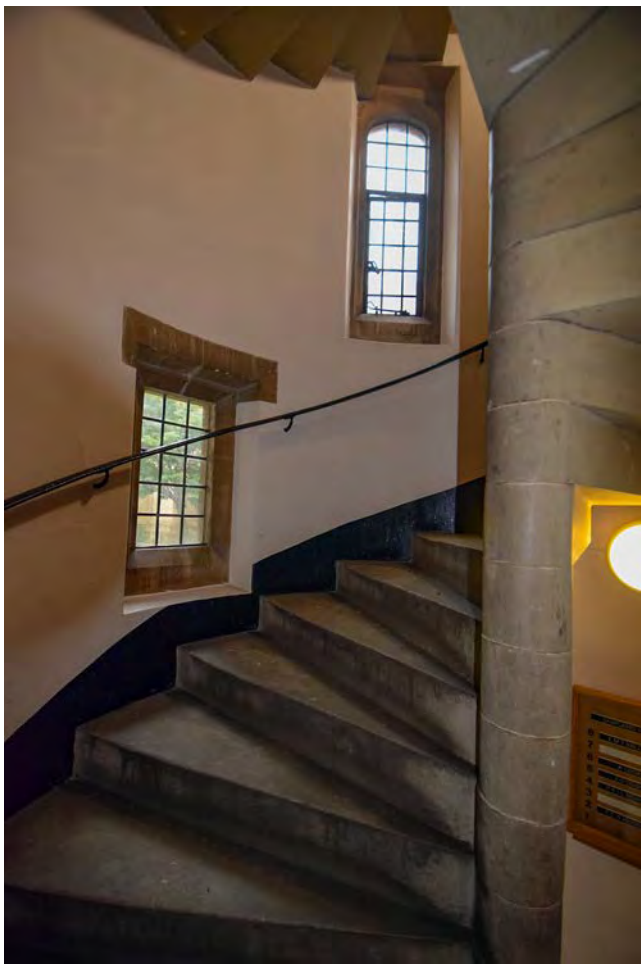


Plate 58: Spiral staircase in Chaplains III

Plate 59: Exposed joists in ground floor of Chaplains III

Plate 60: Temporary stairs during works in Chaplains III

Plate 61: Exposed joists in ground floor of Chaplains III

Plate 62: Primary first floor joist at north end of Chaplains III

Plate 63: Underside of first floor above Ante Room

Plate 64: Ground floor of Chaplains III during strip out

Plate 65: Ground floor of Chaplains III during strip out

Plate 66: Underside of first floor joists in Chaplains III

Plate 67: North wall of Chaplains III

Plate 68: North wall of Chaplains III

Plate 69: Doorway created in north wall of Chaplains III

Plate 70: Jamb of new doorway created in north wall of Chaplains III

Plate 71: Reused moulded stone in jamb of new doorway

Plate 72: Stone 1 from doorway created in Chaplains III

Plate 73: Stone 1 from doorway created in Chaplains III

Plate 74: Stone 2 from doorway created in Chaplains III

Plate 75: Stone 2 from doorway created in Chaplains III

Plate 76: Stone 3 from doorway created in Chaplains III

Plate 77: Stone 4 from doorway created in Chaplains III

Plate 78: Stone 5 from doorway created in Chaplains III

Plate 79: Stone 6 from doorway created in Chaplains III

Plate 80: Stone 7 from doorway created in Chaplains III

Plate 81: Stone 8 from doorway created in Chaplains III

Plate 82: Moulded stones found when doorway created

Plate 83: Doors at first floor level in Chaplains III

Plate 84: Room at north end of first floor of Chaplains III

Plate 85: Room at north end of first floor of Chaplains III

Plate 86: Room at south end of first floor of Chaplains III

Plate 87: Exposed partition in first floor of Chaplains III

Plate 88: Exposed partition in first floor of Chaplains III

Plate 89: Exposed first floor partition with inserted doorway

Plate 90: Exposed partition towards north end of Chaplains III

Plate 91: Exposed frame of corridor lobby at first floor of Chaplains III

Plate 92: Lintel from former doorway

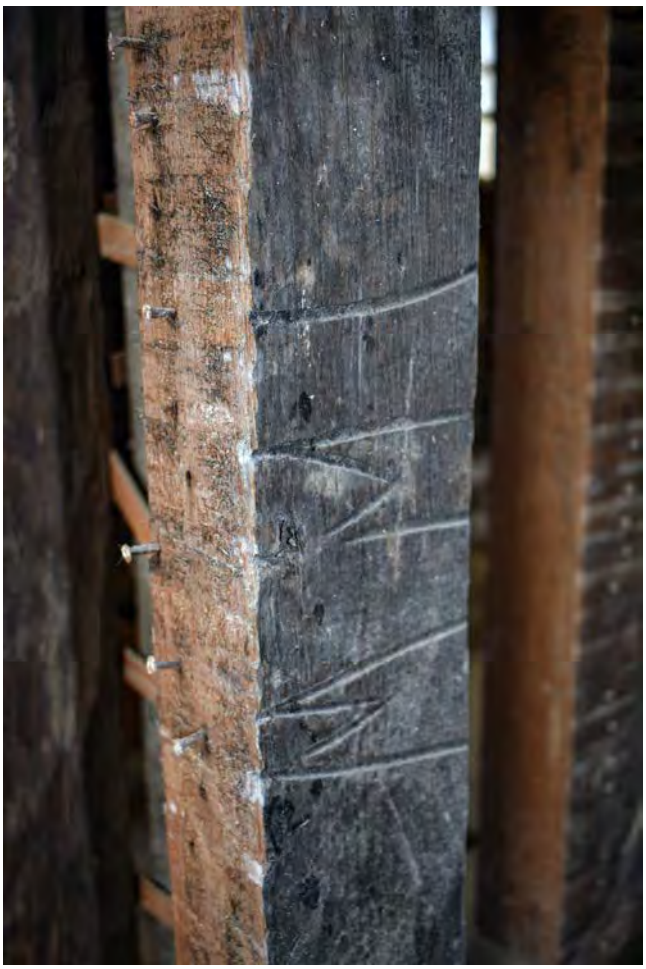


Plate 93: Baltic timber marks to first floor frame

Plate 94: Baltic timber marks to first floor frame

Plate 95: Underside of second floor ceiling in Chaplains III

Plate 96: North end of Chaplains III

Plate 97: Section of partition formed from plaster blocks with reeds

Plate 98: Detail of plaster block partition with reeds

Plate 99: First floor of Chaplains looking south

Plate 100: Exposed fireplace at south end of Chaplains III

Plate 101: Part of exposed west wall of Chaplains III by staircase

Plate 102: Southern end of east wall

Plate 103: New stairs being constructed at north end of first floor

Plate 104: Part of west wall at first floor of Chaplains III

Plate 105: Part of west wall at first floor of Chaplains III

Plate 106: Part of west wall at first floor of Chaplains III

Plate 107: Exposed fireplace in east wall of first floor of Chaplains

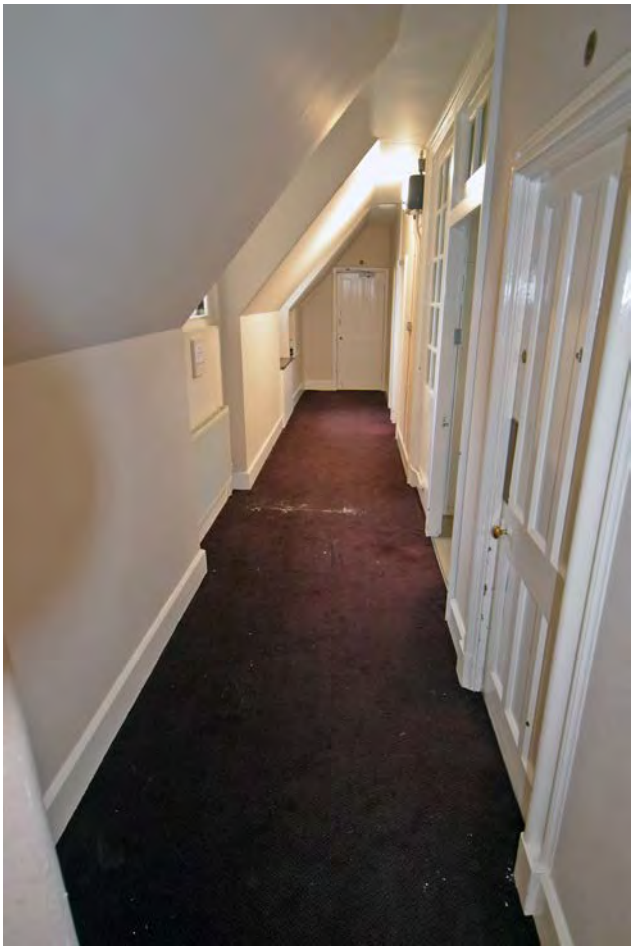


Plate 108: Second floor of Chaplains III

Plate 109: Room at north end of Chaplains III

Plate 110: Room at south end of Chaplains III

Plate 111: Exposed second floor at north end of Chaplains III

Plate 112: Joists at second floor of Chaplains III