

A note on possible astronomic noon markers at Arbroath Abbey, Angus

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A chance observation, mid-December 2005, in the nave of Arbroath Abbey, Angus, resulted in some detailed observations on the behaviour of two easily visible patches of sunlight, both of which extinguish at astronomic noon (in Arbroath this is Greenwich mean time plus ten minutes). These are located – (i) at/in the applied arcade behind the site of the high altar and (ii) in the passage to the upper sacristy. On days with veiled sun, observations of the sun can be made, but not when the sun is obscured.

The presbytery was probably the earliest part of the Abbey to be built, between 1178 and 1233. Stonework delimiting the sun ray has been restored in the presbytery area and the arcade has been resurfaced and restored minimally. This would not affect the light spots very much, possibly altering the size slightly. The light ray is stopped by two vertical edges: a window jamb (restored at an early date) and the corner of the sacristy (original) which are in direct line with one another and the centre light spot on the arcade. The sacristy, much of which remains, was built in early 1400s and consecrated in 1435. The stonework here is in good condition and does not appear to have been restored in the fabric concerned. The window surround appears original and is in good condition.

SITE 1: THE APPLIED ARCADE BEHIND THE SITE OF THE HIGH ALTAR

In December, before noon, three patches of sunlight appear in three adjacent arches. The left hand patch fades and dies away, the middle patch (illus 1) becomes very round and bright before fading out at astronomic noon and the right hand patch extinguishes shortly after. (At midwinter, due to an adjacent church spire, the right hand patch fades earlier than the middle one.)

After mid-March, these light spots are too far down on the wall to be observed, and the upper stonework delimiting the ray of sunlight is missing.



ILLUS 1 Applied arcade, Arbroath Abbey (east end of choir) showing centre light spot just before astronomic noon (12:06 on 17 December 2005)

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ILLUS 2 Astronomic noon within sacristy of Arbroath Abbey, extreme tip of light streak moving off wall to left of photograph (taken on 31 December 2006). The remainder of the streak is in the centre of the picture on the wall further back

corner) and the top part of the light beam moves off the wall at astronomic noon (illus 2). Shortly afterwards, the beam, now on the recessed wall behind, extinguishes. On hazy days the sun can also be observed directly. These effects at Site 2 are visible from the lower sacristy between September and March.

DISCUSSION

The question remains, what happened between March and September? There are a number of possibilities but so much of the fabric of the original building is missing that at present no suggestions can be given any real support.

Arbroath Abbey was built with enormous expense and great expertise. It is not orientated east/west, but nearly ENE/WSW. One possibility is that this astronomic noon effect could be used to adjust the time-keeping devices (sandglasses and candles) of the time.

Later churches on the Continent (17th, 18th and 19th centuries) sometimes have a meridian line on the floor, yielding useful astronomical information for each venue (Heilbron 1999).

SITE 2: THE PASSAGE TO THE UPPER SACRISTY

The passage to the upper room is visible from ground level (lower room) through a small opening high in the wall of the lower room, which was accessed by a ladder. A narrow beam of light from a lancet window in the exterior wall crosses the stairwell and the small passage, to strike on the wall opposite (illus 3). It tracks along the wall, reaching the edge (vertical



ILLUS 3 View of sacristy passage from ground level (12:01 pm on 17 December 2005), before astronomic noon, light still on curve of arch (centre)

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