

# THE ENGLISH SCRATCH & MASS DIAL ERA: ORIGINS TO c.1250

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Compared to the subsequent (c.1250 – c.1650) evidential period,<sup>1</sup> we are considering a much longer elapsed time, whose origins are lost in the mists of early history, with surviving evidence some two orders of magnitude less abundant – a mere 50 Saxon dials have been recorded.<sup>2</sup> Obtaining a full and accurate picture from such limited evidence poses two questions. The specific context of what survives; and, just as – if not more – important, the context of what has not (see Fig. 1). Recorded Saxon dials cannot be considered representative, and any survival (not yet found) of other (more primitive) mass dial types is exceedingly unlikely. As surviving direct evidence yields a partial and potentially misleading picture, this article also considers the more indirect evidence, factors hitherto bypassed in the dialling literature.

The prime contextual element is that of the churches with which mass dials are associated.<sup>3</sup> On the basis of written records (primarily Bede) there were at least 100 churches in England by 700. Given the fragmentary nature of original sources and the recorded number of monasteries and bishops, this must be but a small (yet unknowable) fraction of the churches by then established. Documentary sources indicate almost all were built of timber; few of the earliest churches were of stone, usually recycled Roman material. The typical early pattern was for monasteries, initially established with royal but subsequently also aristocratic patronage, to act as a base from which a network of dependent churches developed. Not all of these had a full time permanent priest. An accelerating trend towards localism began in the eighth century as lesser lords established their own local estate churches.<sup>4</sup> Many if not most churches were too small for their congregation which gathered outside around the cross. The Domesday Book refers to some 3,000 churches. Detailed research indicates that allowing for those omitted results in an estimate of 6-7,000 at the time of the Conquest.<sup>5</sup> Only about 400 churches are now thought to contain any Anglo-Saxon fabric, three-quarters of which can be dated to post-950.<sup>6</sup> That so little survives reflects both the original preponderance of timber churches and the destructiveness of the Norman rebuilding.

Only the most distinguished and important churches were (re)built in stone. All others were of timber. As indeed was all non ecclesiastical Anglo-Saxon building, including all that for royalty – a reality mirrored in the entire Old English

building/construction vocabulary relating to wood.<sup>7</sup> Churches were the first, and for a very long time the only, departure from timber construction. Even when the tenth and eleventh centuries were witnessing a boom in stone church building, and even if overall expenditure on stone building exceeded that in timber, it is probable most churches were still (re)built in timber.<sup>8</sup>

As most Saxon dials were obviously associated with stone churches, they mainly date to the end of the Saxon period. Recorded dials occur on about 10% of churches with some Anglo-Saxon fabric. Depending on their original incidence there is a maximum attrition over the course of a millen-

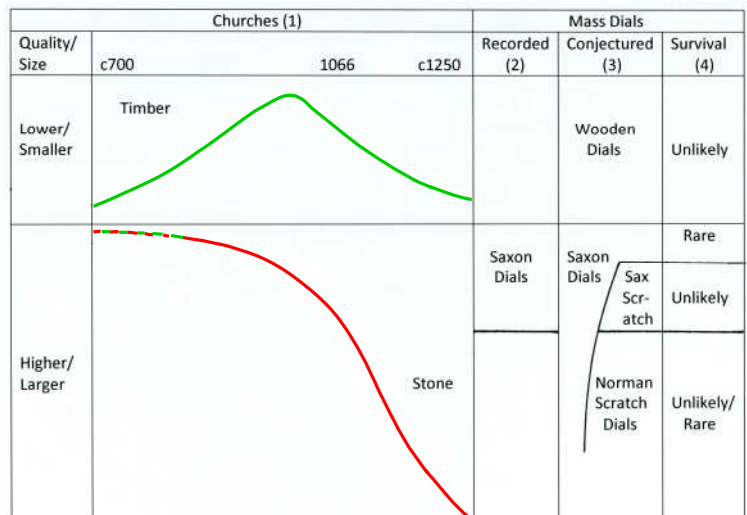


Fig 1. Categorisation of Anglo-Saxon mass dials and churches.

Notes (see main text for discussion)

1. Indicative evolution of churches; their total is represented by the gap between the curves. Most churches were of timber and small. The Great Norman Rebuilding simultaneously destroyed most of what pre-existed and accelerated the trend towards larger higher quality stone churches.
2. This article uses the term 'Saxon dials' as it has come to be understood in the literature – high quality carved mass dials. They were associated with high quality churches, primarily a feature of the later Saxon period.
3. Predicated on dial universality, predominance of timber use, and the virtually complete destruction of original dials. Saxon dial survival might reflect their continued use and manufacture in Norman times. The possibility of Saxon scratch dials cannot be excluded.
4. Survey rates suggest visible survivals have been found. Any additional evidence requires archaeological retrieval and would be of a 'one-off' nature.

nium of 90%. At just 0.25%p.a. this is substantially below the loss to be expected for scratch dials of such great age.<sup>9</sup> But Saxon dials are not scratch dials; they are carved, many deeply, many in relief. That is why they have survived; being more robust not all have weathered out, being artistically attractive they have better cheated rebuilding's destructive nature. Any scratch dial is most unlikely to have survived; none has yet been recorded.<sup>10</sup> Did all late Saxon stone churches have a mass dial? Statistically all we can infer is that unless the majority originally had a Saxon dial their survival rate is implausibly high. As the highest quality churches, is it not inconceivable they were without a mass dial? If not a Saxon dial then at least a scratch dial.

*Fig 2. The Celtic dial at Clynog Fawr, Caernarfonshire. It is presumed to have been originally located within the nearby monastery founded by St Beuno in the seventh century. Photo by Mike Cowham.*



Looking beyond late Saxon stone churches (i.e. to most of the elapsed time and the vast majority of churches), there is limited British evidence in the form of incised/carved dials on freestanding stone columns thought to have been originally erected in the vicinity of churches. Recordings, with one exception, are Celtic (Fig. 2) – a dozen Irish (spanning the seventh to twelfth centuries), a pair of Welsh, and an Isle of Man dial(s).<sup>11</sup> Only a single, stylistically very different, English example at Bewcastle (dated to c.700) is known.<sup>12</sup> Most Celtic dials can be linked to an important monastic site. Clearly England had fewer and later sites of comparable stature. Even so the disparity in recordings is glaring. There can be no doubt these were very expensive dials, limited to churches of ecclesiastical import or with indulgent patrons. These would have been the largest and best of timber churches and the earliest to be (re)built in stone. Dials of such quality would not have graced the typical small timber church.

What, in terms of mass dials, happened at the vast majority of Anglo-Saxon churches – the humble wooden church in need of frequent rebuilding? The only absolutely certain fact is that not an iota of direct evidence has yet been found. The *a priori* case for the universality of mass dials has already been presented.<sup>13</sup> Exhaustive statistical analysis has

demonstrated its validity in the post-1250 evidential period. We have also noted that a majority of late Saxon stone churches must have had Saxon dials. Can we, in the face of a virtual absence of any other recorded dials, presume universality? How far back might it be reasonable to do so?

Recorded freestanding stone dials, of themselves, prove sundials were familiar objects within British monasteries from at least the seventh century. Although Celtic rather than English, monasteries were the intellectual international internet of their day. Given their central role in propagating English Christianity, as well as the particular contribution of Irish monasteries, it must be taken as axiomatic that sundials were from the outset well known to the English church. Time was always a matter of particular interest to the Church; both the hours to organise the day, and the calendar to determine Easter. Bede's temporal deliberations and mention of sundials are well known.<sup>14</sup> A related concern was the broadcasting of time; Pope Sabinianus (604-6) issued a Bull stipulating bells mark the canonical hours.<sup>15</sup> It is also essential to recognise that time indication was not the only, or even (especially in the Church's early days) the primary, function or purpose of dials. They need to be interpreted within their contemporary artistic/cultural traditions. As such a symbolic role is only to be expected, most obviously via allusions to the sun. Sundials could have been part of the Christian riposte to, or accommodation of, pagan iconography.<sup>16</sup>

The paradox between the indirect evidence indicative of widespread awareness, need and use of sundials with the almost nonexistent direct evidence of survivals, can only be reconciled if the predominant material medium of dials was not stone. The locally available repertoire of vernacular craftsmanship was confined to timber.<sup>17</sup> It would have been the economical resource most naturally called upon to make dials for the vast majority of Anglo-Saxon churches, just as it was for the churches themselves. What did wooden dials look like? Probably similar to their stone cousins. Wooden crosses close to churches were common. These could easily accommodate a sundial, in exactly the same way as the Bewcastle Cross.<sup>18</sup> Again mirroring their stone cousins, it is easy to imagine dials made from wood boards. Wooden dials undoubtedly ranged from the crudely incised to the intricately carved.<sup>19</sup> For most of the Anglo-Saxon period timber was the only structural material; stone only began to make significant inroads in late Saxon times, precisely when the frequency of recorded Saxon dials becomes non negligible.

Interpreting the Anglo-Saxon era is thus not just a simple matter of examining its surviving dials. Recorded Saxon dials are a highly skewed sample illuminating, probably reasonably accurately, one specific corner – mass dials at high quality late Saxon stone churches. The rest is in effect a black hole. Any recordings not attributed to the late Saxon period constitute another even smaller and more skewed sample. The two usual reactions to limited data – it is a



Fig 3. Saxon (left, Bishopstone, Sussex - photo by Mike Cowham) and scratch (right, Waltham, Kent - photo by Tony Wood) dials compared. Although equivalent in purely functional terms, the Saxon dial is of a much superior aesthetic quality. Note the

- use of a specially chosen, as opposed to a normal structural, stone;
- fine carving, rather than crude incising;
- elaborately carved decorative frame;
- inclusion of a carved inscription.

reflection of original absence, or await additional evidence – are both misplaced. Whilst it is hoped additional evidence will come to light, the discovery of Anglo-Saxon scratch or wooden dials would be an archaeological triumph.<sup>20</sup> But it is totally unrealistic to expect any such evidence will ever be found in sufficient quantity to discriminate between the two competing hypotheses – were mass dials uncommon or were they (near) universal with the evidence destroyed in the interim? There is no alternative to going beyond direct dial evidence; not to do so would be unscientific.

Is there any way of assessing the validity, beyond that of the factors on which it is predicated, of this article's conjectured hypothesis? A true hypothesis invariably gels with other data and resolves interpretive conundra. Were the mass dials of Saxon times as different from their medieval successors as indicated by what is generally accepted to be Saxon dials versus scratch dials? (Fig. 3.) If they were it would be a degree of retrogression not mirrored in any other contemporaneous field of artistic or cultural endeavour. A convincing explanation why sundials alone should be so prone to severe relapse is not obvious. In our conjectured hypothesis medieval scratch dials had equivalent Anglo-Saxon ancestors. And the true descendants of Saxon dials, the upmarket – the best there is – statement, are clocks and scientific sundials not scratch dials. Turning to another example, exhaustive statistical analysis has established mass dial universality post-1250. Although the data do not exist to prove it earlier, why universality should be as late as c.1250 is not obvious. Our conjectured hypothesis removes such problems, pushing any non universality back towards the origins of Christianity. One cannot consider the Anglo-Saxon period without the Canterbury pendant seasonal hour altitude dial, dated to the tenth century, coming to mind.<sup>21</sup> Made from silver and gold it is an upmarket product. Less well known is that a virtually identical dial, made of bog-oak and bone, survives.<sup>22</sup> The use of wood is noteworthy *per se* and because it suggests portable dials were common, both of which are fully consistent with our conjectured hypothesis.

Readers will have to reach their own conclusions bearing in mind that the statistically proven standard of the evidential period can never be attained for Anglo-Saxon times. Short

of a council of despair, we have no choice but to do the best possible, hence the conjectured hypothesis. Although in an absolute sense unproven, it is the interpretation that most coherently integrates four separate considerations – the characteristics of the Christian church, the dominance of timber, a plausible transition to the evidential period, and the paucity of surviving dials.

Accepting the conjectured hypothesis, would the churn (loss and replacement of in use dials) and redundancy (leading to the progressive accumulation of multi-dialled churches) typical of the evidential period have occurred? They would have manifested themselves differently. For wooden dials at timber churches, churn would have been accentuated to such an extent (by deterioration of the dial itself/frequent periodic rebuilding of the church) as to preclude the accumulation of redundant dials. In the case of stone (including scratch) dials cumulative redundancy would be muted by the comparatively short lifespan of churches.<sup>23</sup> An Anglo-Saxon church with two mass dials would have been unusual, more an exceptional rarity.

#### REFERENCES AND NOTES

1. Chris H.K. Williams: 'The English Scratch & Mass Dial Era: The Evidential Period c.1250 to c.1650', *Bull BSS*, 21(iv), pp.18-19, (2009).
2. We continue to focus on dial prevalence with style and type deferred to subsequent articles. Recorded Saxon dials have recently been reappraised by David Scott & Mike Cowham. Their monograph, *Timekeeping in the Medieval World*, is expected later in 2010.
3. Brevity precludes inclusion of much supporting material and citation of all sources consulted. Three comprehensive works are P.H. Blair: *An Introduction to Anglo-Saxon England*, CUP, 3<sup>rd</sup> Ed., (2003); E. Fernie: *The Architecture of the Anglo-Saxons*, Batsford, London, (1983); R. Morris: *The Church in British Archaeology*, Council for British Archaeology, (1983). Each contains an extensive bibliography.
4. Some had the consent of the minster, others were unilateral. Unlike minster-dependent churches these were in the private ownership of laymen – subject to inheritance, sale and purchase. A private church conveyed 'thegnlý' status plus a source of income and influence. This dual provision of minster and propriety churches created, especially as church density increased, financial and jurisdictional disputes, resulting in numerous tenth and eleventh century law codes categorising different types of church.
5. Mention of a church is incidental to the Domesday Book's purpose – taxation and ownership. The estimated number of churches takes account of the differing conventions adopted by

- the five groups of Domesday commissioners, the 1254 and 1289-91 tax surveys, and many detailed local studies suggesting around three quarters of medieval churches are on Saxon sites. See R. Morris: *Churches in the Landscape*, Dent & Sons, (1989).
6. H.M. & J. Taylor: *Anglo-Saxon Architecture Vols. I, II & III*, CUP, (1965 & 1978).
  7. 'To build' is *timbran*.
  8. St Dunstan (Archbishop of Canterbury, 960-88) is recorded building timber churches. His biographer notes that on finding a church incorrectly orientated, Dunstan achieved the desired alignment with his shoulder! See W. Stubbs (Ed): *Memorials of St Dunstan, Archbishop of Canterbury*, (1874). As late as 1020 a court chronicler saw fit to leave no doubt a church endowed by Cnut was of stone and lime.
  9. Williams: *Op. cit.* and references therein.
  10. Statistically expected Anglo-Saxon scratch dial survivals, before allowing for Norman destruction, are in single figures. Moreover, unless any survival could be definitively placed in an Anglo-Saxon horizon, would it be recognizable as such?
  11. M. Arnaldi: *The Ancient Sundials of Ireland*, BSS, (2000); W. Linnard: 'Welsh scratch dials', *Archaeologia Cambrensis*, 156, p141-7, (2007).
  12. C.K. Aked: 'Bewcastle Cross Part I & II', *Bull BSS*, 95(1) & (2), 2-8 & 10-17, (1995); K. Schaldach; 'Bewcastle Cross', *Bull BSS*, 95(3), 47 & 34, (1995).
  13. Chris H.K. Williams: 'The Life Cycle of English Scratch (Mass) Dials', *Bull BSS*, 20(iv), 164-5, (2008).
  14. *De temporibus* (704) & *De temporum ratione* (725).
  15. Efforts to locate an authoritative source for Sabinianus' alleged requirement churches have a sundial failed. The bell ringing Bull can be traced to Onofrio Panvinio (1557), papal librarian and historian. The sundial attribution appears to be a tradition established by subsequent students.
  16. It is a misconception to view Christianity and paganism in binary terms. Evidence of coexistence and accommodation abound. Some kings literally hedged their bets by supporting both. Paganism was polycentric, adopting another deity (or form of magic) was not the absolute issue it was for monotheists. Springs and wells were important pagan sites, yet many early churches were established near them. Animal sacrifices were tolerated if part of feasting rather than the ceremony. There is even evidence priests were present at the casting of spells, parts of which might even take place in church. Traces of paganism were never entirely extinguished. As late as Cnut, law codes forbade the worship of 'idols, heathen gods, the sun or moon, fire or flood, springs, and stones or any kind of woodland tree'.
  17. Until late Saxon times stone work was the alien craft, sourced via the international monastic network, as indicated by the Mediterranean influence discernable in the Bewcastle Cross' carving.
  18. It is interesting to speculate that wooden Celtic dials were made by the Celts; and that the apparent triumph in England of the Bewcastle model over the Celtic could reflect the latter becoming, at least in England, politically incorrect after the ascendancy of the Roman faction at the Synods of Whitby (664) and Hertford (672).
  19. The former dismissive view of Anglo-Saxon carpentry has been decisively rejected. See C. A. Hewett: *English Historic Carpentry*, Phillimore, (1980). During the Saxon, Norman and Early English periods the system used for timber buildings seems to have been constant. Surviving examples of craftsmanship shows a high level of skill and the use of sharp sophisticated tools. Doors used seasoned timber. Anglo-Saxon carpentry was neither embarrassed nor eclipsed by their medieval successors.
  20. On three counts. Any survival would be exceptional – wood for obvious reasons, see note 10 for scratch dials. Next any find would have to be in an undisturbed and indisputably Anglo-Saxon horizon. Finally would any (partial) survival be recognised as a dial by the archaeologists? The other potential evidence is documentary. But it is sadly true that sundials are not on the agenda of scholars who regularly read original sources, and few diallists are competent to do so. Accumulation of such evidence will be a long slow process.
  21. A.A. Mills: 'The Canterbury Pendant: A Saxon Seasonal-Hour Altitude Dial', P.I. Drinkwater: 'Comments upon the Canterbury Pendant', and A.J. Turner: 'The Canterbury Dial', *Bull BSS*, 95(2), 95(3) & 96(1), 39-44, 48 & 46-7, (1995 & 1996).
  22. Turner: *Ibid.*
  23. Almost all surviving medieval churches lived through the entire 400 year evidential period. A 400 year old stone Anglo-Saxon church would have been a rarity. Most were built in the tenth and eleventh centuries and subsequently destroyed by the Normans. Furthermore their small size can only have reduced redundancy attributable to dial relocation.

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## THE ANCIENT ASTRONOMERS OF TIMBUKTOU

In his article on the replica Timbuctou Sine Quadrant (*Bull* 20(iv), pp.166-8, Dec 2008), Malcolm Barnfield described making a quadrant for use as a 'prop' to be used in the making of a film about the conservation project for the ancient astronomical manuscripts of that city. The finished film is now available as a DVD. It costs R170 (about £14) and details, together with a short preview, can be found on the website of Johannesburg Planetarium at [www.planetarium.co.za/](http://www.planetarium.co.za/).



## MRS GATTY ONLINE

The project to make Mrs Gatty's famous *The Book of Sun-Dials* available online has now been completed. It may be found at <http://tinyurl.com/y9r7r4f> (the full URL at Penn University is much longer). The website shows scans and full transcriptions of every page of the 4<sup>th</sup> (Eden & Lloyd) edition from 1900 which is by far the best.

The transcription was part of the collaborative 'Celebration of Women Writers' project so diallists benefit from a little gender bias. Thanks go to Michael Harley for bringing the project to the Editor's attention.