WREN’S DIAL REMOV’D

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DESCRIPTION OF THE DIAL

The dial can be seen in Fig. 1 and in colour in Fig. 2 on page 155. The circular dial face is splendidly painted and gilded. With surrounding carved stonework of ornate garlands topped with a cherub, it was originally designed to fit between two pinnacles high up on the centre of the south-easterly façade of the chapel.

A circular blue chapter ring encloses black hour lines and an oval coat of arms of the college. Slanted Roman numerals in the chapter ring run from 6am to 5pm with intermediate half-hour spots. The chapter ring is enclosed by a band of black and red quarter-hour divisions. Surrounding that is a ‘sunburst’ of gilded rays, one for each hour and half-hour, the half-hour rays being shorter. The edge of each ray is outlined with thirty black minute marks “so that one may see to a minute what it is a clock, the minutes being depicted on the sides of the rays, viz., 15 on each side, and divided into fives by a different character from the rest.” The marks for 5, 10, 20, 25, 35, 40, 50 and 55 minutes past the hour are short black lines, perpendicular to the outline of each ray and the intermediate minutes are black dots. These marks, otherwise known as ‘stepped’ or ‘interrupted’ transversals, are potentially more accurate than the normal ‘diagonals’ seen on horizontal dials, e.g. those by Tompion, Rowley and Thomas Wright. They were unusual on large vertical sundials of the 17th century and because of them the All Souls dial seems to have had a reputation for accuracy. The clock-makers of Oxford are said to have called at the college to regulate their time-pieces by it well into the reign of Queen Victoria. The actual delineated timescale on the transversals runs from 5:15 am to 5:15 pm which suggests that the declination of the chapel wall for which the dial was made, is about 14° east of south.

Wren designed the proportions of the All Souls sundial very cleverly. The origin of the hour lines is offset to the east of centre to give a more even spread of hour lines around the circular face. The chapter ring is not centred on the dial face but is slightly above the centre so that the bottom of the elliptical coat of arms touches the centre of the dial stone and the rays at the bottom of the dial are longer than the others. Although the dial face is circular it appears to be elliptical from below. Wren was perhaps experimenting with the effects of distortion when placing an ellipse within concentric and non-concentric circles.
The functional detail of the dial itself is shallowly-carved whereas the coat of arms, floral decorations and ribbon motto are more sculptural. The circular dial face is made of sections of a finer and whiter stone than the surrounding pinnacles, perhaps because it carved better for finer detail and because it shows a better shadow.

The gnomon is a simple rod with a ball finial and a forked support. The feet of the support are set into the stone below the dial face between it and the ribbon motto below. The style is made of a rod with a circular cross section suggesting that Wren intended the time to be read from the centre of its shadow rather than from its leading edge. The gnomon shadow seems thin but it is necessarily so if one is to read the finer divisions on the transversals.

The Latin motto ‘Pereunt et imputantur’ (‘Our days/hours perish and are scored to our account’) is taken from Martial’s *Epigrammata* Vxx. The relevant passage reads,

> Bonosque soles effugere atque abire sentit
> Qui nobis pereunt et imputantur

Which can be translated as “And he feels good days are flitting and passing away, Our days/hours perish and are scored to our account.” Another translation of the motto used in Oxford and mentioned by Gunter, is said to refer to the Fellows of All Souls: “They perish and are not thought of!” The same motto appears on seventeen recorded dials in the BSS register, the earliest dating from 1635.
On top of the All Souls sundial is a gilded weather vane in the shape of a beast-like Grim Reaper with a very large scythe, mounted on a stone ball. This weather vane appears to be as old as the sundial as it is shown in early etchings (see Figs. 3 & 4). Perhaps the Grim Reaper is an allegorical reference to the full name of the college which is The College of All Souls of the Faithful Departed.

It is not known if the present colour scheme of the sundial is copied from the original. It is now in need of repainting.

HISTORY OF THE DIAL

In the year when Christopher Wren held the position of Bursar of Laws at All Souls, the accounts books record that a payment of £32.11.6d was authorized on 23 November 1658 to a “Mr Bird for the diall in the Quadrangle lately erected”. William Bird (or Byrd) was an Oxford stonemason. Further payments to Mr Bird, Mr Wells “the Joyner” and Mr Hawkins for painting add up to a total outlay of £57 on the sundial, a sizeable sum in the mid-17th century.

The sundial seems to have stayed undisturbed for the next two hundred years despite major rebuilding of the college in the early 18th century by Nicholas Hawksmoor who added an extra quadrangle and the enormous 200-foot-long Codrington Library. (See Fig. 5 for the college ground plan.) Hawksmoor loved symmetry and because a new hall extended the façade on which the sundial was mounted, he balanced the sundial which was towards one end by adding a new cartouche (Fig. 6) towards the other. Like the sundial, the cartouche is set between two pinnacles. It carries the coats of arms of five major benefactors of the building of the hall. Although the cartouche is still there today, the sundial no longer balances it.

During repairs to the chapel in 1871 the sundial was found to be in a bad state of repair and was removed and stored until 1877. Then one of the Fellows proposed that the sundial be mounted on the Codrington library building in Hawksmoor’s quad beyond the chapel and although he met with some opposition, his view prevailed. Simmons’ objection to the repositioning of the sundial was one of aesthetics: “Thereafter, a sundial designed to crown a five-bay frontage but perched disproportionately over an eleven-bay one it [sic] has ever since shamelessly punctuated the harmonious ‘compulsion of symmetry’ that informs Hawksmoor’s quadrangle.”

The wall of the Codrington library declines approximately 1.3° further East than the chapel wall so the sundial could be expected to be a few minutes slow. It is uncertain if the difference in declination is enough to account for the inaccuracy of 7½ minutes slow to local apparent time observed on 22 July 2006. The Victorian Fellows of All Souls may not have adequately supervised the repositioning of the sundial to account for the difference in declination. Subsequent repairs may have disturbed the setting of the gnomon. Either way, it should be possible to determine how the error arises and to realign either the dial, or the gnomon or both.

Fig. 5. Ground plan of the college showing the original and current locations of Wren’s dial, the cartouche added by Hawksmoor, and the old gnomon shown on the Loggan print.

Fig. 6. The cartouche that used to balance the sundial.
Although the amount of Simmons’ bequest is not known, it may not have been adequate to cover the costs of a major removal between buildings. However, it seems a shame that the present day authorities at All Souls will not at least ensure that the sundial tells the correct time even if they do not agree with Dr. Simmons’ aesthetic sensibilities on its position.

Simmons himself once remarked: “We [the Fellows of All Souls] may elect cranks but we don’t elect fools.” He was well known in Oxford circles, not least for the tie he devised and gave to friends who shared his belief in the four Cs – conserve, consider, contribute, co-operate. He seems to have come up against some opposition from amongst the Fellows and from the authorities responsible for the college buildings.

In 2002 he wrote: “The battle for our sundial still rages, but I gather that English Heritage is getting a new boss. I’ll give him a couple of weeks and then return to the charge. He can’t possibly be as bloody-minded as his new colleagues [in English Heritage] are.”

He met some BSS members at All Souls during a very wet afternoon sundial tour as part of the BSS Oxford Conference in 2004. Although then in his late 80s, he was vigorous in his determination to get something done about the sundial and from a damp plastic bag handed out postcards of a mock-up colour photograph showing Wren’s sundial back on the chapel wall (Fig. 7 on p.155).

**WREN’S DIALLING INTERESTS**

Wren (Fig. 8) had a practical interest in dialling from a very young age. As a child he had lessons from his brother-in-law Dr William Holder who later published *A Discourse Concerning Time* (1694). While he was a schoolboy Wren designed an instrument for drawing lines on a sundial and at thirteen made an instrument which he called a *panorogamus astronomicum* which could have been a kind of orrery. The diarist John Aubrey says that as a teenager Wren made “several Curious Dialls, with his owne handes” in the grounds of William Holder’s parsonage at Bletchingdon, Oxfordshire.  

Wren seems to have gone up to Wadham College, Oxford in 1646 at the tender age of 14. In about 1647 he had a serious illness and was sent to recover in London with Charles Scarburgh, a physician friend of Holder’s. Scarburgh had taught mathematics at Cambridge and had a fine collection of mathematical and scientific books. While staying with Scarburgh, Wren wrote a treatise on spherical trigonometry and impressed Scarburgh with his design for a weather-clock that recorded fluctuations in wind speed and temperature.

Scarburgh knew William Oughtred and encouraged Wren to translate from English into Latin Oughtred’s treatise on dialling written in 1598. Wren wrote, “The doctor promises, I may both gain an old man’s favour, and at the same time win that of all those students of mathematics who acknowledge Oughtred as their father and teacher.”

Oughtred was delighted with the translation and published *Horologiorum Sciatricorum in plano* as a supplement to the third and subsequent editions of *Clavis Mathematicae*. Oughtred presented Wren with an inscribed copy of the third edition (1652) and described him in the preface as “Christopher Wren, gentleman commoner of Wadham College, a youth generally admired for his talents, who, when not yet sixteen years old, enriched astronomy, gnomics, statics and mechanics, with brilliant inventions, and from that time has continued to enrich them, and in trust is one from whom I can, not vainly, look for great things.” (Fig. 9.)
Back in Oxford at the lodgings of John Wilkins, Warden at Wadham, Wren attended the early meetings of a group of natural philosophers which was to become the Royal Society. His wide range of interests included experiments on the circulation of the blood and intravenous injections using live dogs. Among other subjects he explored ciphers, fortifications, and the grinding of lenses. His interest in astronomy seems to have developed during the 1650s when an observatory was set up at Wadham. He found time to make a reflective ceiling dial (now lost) in his room at Wadham, with figures representing Astronomy and Geometry.\(^8\) An inscription accompanying the ceiling dial read:

CHR. WREN.
Angustis satagens his laquearius
Ad creli methodum tempora pingere,
A Phoebo obtinuit luminis ut sui
Idaem, speculo, linqueret æmulam
Quæ cœlum hoc peragret luce vicariā,
Cursûsque effigiem fingeret annui;
Post annos epochæ —

\[
\begin{align*}
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S & \text{HO} \\
V & \text{I} \\
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V & \text{I} \\
G & \text{N} \\
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E & \text{S} \\
M & \text{O} \\
C & \text{O} \\
U & \text{T} \\
\end{align*}
\]

This can be translated as

“Chr. Wren, busyng himself on this narrow fretted ceiling, was enabled by Phoebus in accord with the movement of the heavens to represent the times so that with the reflector he might leave an Idaean rival of his light to travel over this heaven with borrowed brightness and form a likeness of his annual course. 1648 years after the time when God was truly made man from the Virgin’s womb and in the 16th year of his own youthful age.”

The date 1648 and Wren’s age are obtained from the chronogram in the last three lines of the Latin by adding up the values of the bold Roman numerals. The word ‘Idaean’ seems to be a reference to Ida, the nymph who was identified with the constellation of Ursa Minor by the ancient Greeks.\(^{19}\) ‘Idaean’ could also be a pun on the word ‘Wadham’.

When designing the All Souls dial Wren may have been inspired by the other sundials in Oxford at the time. The Turnbull dial of 1581 at Corpus and the dial on the chapel at Merton of 1629 still survive. There were dials at Wadham College, too.\(^{20}\) In the 1654 John Evelyn visited Warden Wilkins’ lodgings at Wadham and saw many ‘artificial, mathematical, Magical curiosities’ which included “… Shadows, dyals, Perspectives…A Way-Wiser, A Thermometer; a monstrous Magnes, Conic & other Sections, a Balance on a demie Circle, most of them his [Wilkins’] own & that prodigious young Scholar, Mr. Chr. Wren.”\(^{21}\) Oughtred’s son-in-law, Christopher Brookes, ran a successful instrument-making business from Wadham.

Engravings of the gardens at Wadham by Loggan and Williams, of 1675 and 1732 respectively, show Wilkins’s statue of Atlas which held up a spherical sundial. Pointer describes it in his History of Oxford (1749): “The Globe is an entire Dial without a Gnomon.”\(^{22}\) None of these ‘curiosities’ has survived at Wadham today.

At All Souls there was another sundial of the same orientation as Wren’s. It is shown in Loggan’s engraving of 1675 high up on a chimney stack (See Fig. 3) and is mentioned by Gunther.\(^5\) It seems to consist of a plain east-decliner gnomon without any visible hour lines. Perhaps it was already old and worn by the 1650s.

After Wren left All Souls in 1657 he became Professor of Astronomy at Gresham College, London. Part of his inaugural lecture was devoted to the biblical miracle of the reversion of the shadow upon the sundial of Ahaz (2 Kings xx.11) when God is said to have caused the shadow on the sundial to move back by 10 degrees. Wren speculated that this effect might have been caused by the appearance of a parhelion (a luminous spot in the sky caused by refraction of sunlight through what he called “nitrous Vapours” but which are in fact ice crystals). Wren suggested that the sundial of Ahaz had been one like those which, according to Vitruvius\(^{23}\), were introduced to Greece by Berosus the Chaldaean. He said that although the parhelion might explain the miracle, the explanation did not diminish it, adding that our knowledge of refraction makes the rainbow no less wondrous.\(^{24}\) Peter Drinkwater would not agree with Wren’s interpretation of the miracle (BSS Bulletin. Feb 1992.1). He says that the original Hebrew was mistranslated and that the shadow of two walls passed up and down the sundial which consisted of two back to back flights of stairs.

Wren’s interest in dialling may have persisted throughout his life in spite of his eclectic interests and busy professional life in London. An engraving of 1700 by John Oliver shows Tring Manor, Hertfordshire, which is said to have been designed by Wren. There are two apparently north-facing vertical sundials on the front of the house.\(^{25}\)

In about 1671 Wren presented Wadham with a pendulum clock. This clock had an early ‘seconds’ pendulum and the mechanism is said to have been designed by Wren.\(^{26}\) The clock face is still in position on the chapel wall in the front quad at Wadham (Fig.10). The original mechanism is now kept in the Museum of the History of Science at Oxford. One of the spandrels in the top right corner of the clock face contains three crosses and a chevron, part of Wren’s coat of arms (Fig. 11 on p. 155).\(^{27}\)

The decorative carvings which surround of the clock face bear a remarkable resemblance to the carvings surrounding
the dial at All Souls – a cherub, floral garlands and spiral volutes are common to both clock and dial.

VALUABLE BEQUESTS
The Codrington Library building, the cause of Simmons’ disputed bequest, was itself bequeathed to All Souls. In 1710 Conrad Von Uffenbach wrote:

“After lunch we saw the library in All Souls College, Collegium Omnium Animarum. This is a small poor room with an inconsiderable number of books. But as a Colonel Codrington has bequeathed ten thousand pounds sterling (an amazing sum of money, which could have been turned to better purpose than making a palace for these worthless Fellows, as they for the most part are) – as, I say, he has left this sum for the rebuilding of the college and added to it his fine collection of books worth three thousand pounds, a new library is to be built.”

Even if the present day Fellows feel they could not meet the challenge of Simmons’ bequest, they should at least honour his and Wren’s memory by trying to correct the error in the dial’s time-keeping and by making sure this grandest of sundials is properly maintained.

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REFERENCES AND NOTES
5. The only other vertical sundial with transversals recorded in the BSS Register of Sundials is at St Andrew, Harberton, Devon SRN0375. There are several records of horizontal dials with transversals: SRN4407 Beaminster, Somerset (dated 1723); SRN5298 Woodstock, Oxon by John Rowley (dated 1710); SRN1714 Cranbury Park, Otterbourne, Hants by John Rowley, delineated by Isaac Newton (dated 1720); SRN4488 Raveningham Hall, Norfolk (19th century); SRN3461 Onibury, Shropshire (18th century).
6. Martial was born 40 AD and published in Rome 86-103 AD.
9. SRN2180 Halton, Lancs. There are two from 18th century: at St. Mary, Payhembury, Devon SRN0540 and at St. Buryan, Cornwall (dated 1747).
10. e.g. William William’s etching of the college dated 1732-3 and David Loggan’s of 1675.
12. Quoted in the Daily Telegraph article 12.6.2006
15. There are three dials recorded in the village (SRN1330, 1324 and 4772) but none of them are at the parsonage.
17. A. Chapman: 800 Years of Oxford Mathematics, ch. 5, p.79 Oxford University Press (2000). Other sources suggest he went to Oxford as late as 1649 or 1650. There is a portrait of Wren in Wadham Hall labelled ‘Fellow commoner 1646’.

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Fig. 11. Wren’s coat of arms in stained glass at the Museum of the History of Science, Oxford. Note the universal equinoctial ring dial on the left and the other mathematical instruments. Photo: J. Davis.

Fig. 2 (left). Wren’s sundial on the Codrington Library at All Souls.

Fig. 7 (below). Simmons’ mock-up postcard showing the sundial back on the chapel.