OXFORD SUNDIALS

MARGARET STANIER

OXFORD SUNDIALS

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INTRODUCTION

Sundials

A sundial is a device for marking intervals of time during the day by noting the changing position of the shadow of a fixed object - the gnomon - according to the apparent movement of the sun across the sky. The gnomon usually takes the form of a bar or rod or straight edge of wood or metal. Its shadow may be cast on a vertical, horizontal or curved surface, on which lines marking the time intervals are inscribed and numbered.

"Knowing the time" is important whenever people assemble, for work or play, worship or recreation. Sundials, along with water-clocks and hour glasses, were used as time- or event-markers throughout medieval Europe, until superseded by mechanical clocks. Indeed the use of dials continued and overlapped with that of clocks until the eighteenth century: dials were placed near conspicuous clocks as a means of checking, adjusting and re-setting the clock when necessary. By this time, however, sundials had already become an ornamental feature of buildings and gardens. The designing of sundials could be an appropriate occupation for the leisure of a gentleman, whose education would have included sufficient mathematics and astronomy to enable him to set the gnomon and lay out the hour lines; and the ornament and "dial furniture" would give scope for his wit and imagination. Mechanical, electrical and electronic timepieces have now taken over entirely the practical function of sundials. Happily their decorative function remains, and we may still enjoy the "art of shadows", as ingeniously designed sundials continue to be set in our streets and in public and private gardens.

The main types of sundial are these:-

(a) the vertical, in which the upper end of the sloping gnomon is fixed into a wall or other vertical surface, onto which it casts its shadow, and on which the dial face is inscribed or mounted.

(b) the horizontal, in which the dial plate, usually of brass or bronze, is mounted on a horizontal plinth, and the gnomon, sloping at an angle, is mounted above it; this type is a familiar rose-garden ornament.

(c) the equatorial, in which the numbers and hour lines are marked on a curved surface mounted in a plane parallel with the earth's equator; the armillary sphere, taking the form of several concentric hoops, is a spectacular variety of equatorial dial.

For all these types of sundial, of which fine examples can be found in Oxford, the gnomon must be set sloping at an angle to the horizontal, (51° 45′ for the latitude of Oxford), with the upper end pointing to the celestial north pole, a point in the sky close to the Pole Star. A fourth type of dial, the analemmatic dial, requires a vertically standing gnomon which must be moved according to the time of year. It is therefore an appropriate design for a "human" sundial in which the gnomon is a person standing upright. A dial of this type can be seen in the Pleasure Garden of Blenheim Palace at Woodstock.

Clock time and Sun time

Clocks are set to GMT (or BST), but since Oxford is 1° 15′ west of Greenwich the sun reaches its zenith here 5 minutes later than noon at Greenwich. So all sundials in Oxford would read 5 minutes "slow" compared with the clock.

Furthermore, clocks are designed to show the same elapsed time from midnight to midnight throughout the year. But the rate of turning of the earth on its axis (which gives the apparent daily movement of sun and shadow) is not the same throughout the year: sometimes slightly quicker than average, sometimes slower. This causes a discrepancy between clock-time and sun-time. This discrepancy, (called the equation-of-time correction) is quite small during the summer months. But in mid-November sun-time is 16 minutes ahead of clock time, and in mid-February sun-time is 14 minutes behind clock-time. (Cards at Merton College and a tablet at Brasenose give guidance on the calculation of clock time from dial time. On the Wolfson College dial, a graph on the dial-face permits this calculation.)

Oxford Sundials

In Oxford as elsewhere in Britain the golden age of sundials was the seventeenth and early eighteenth century. We know about these early dials partly from contemporary drawings and college archives; but mainly from fine engravings of the Oxford Colleges published by Loggan (1675, 1688) and another series by Williams (1733). Almost every College had at least one sundial and some had two or three. There were non-collegiate dials also: a sixteenth century dial of 4-sided vertical shape stood on the churchyard wall of the Church of St. Mary the Virgin. Seventeenth century dials adorned each side of the Danby Gate into the University Botanic Garden from the east; and in the 1920's the remnants of an eighteenth century dial were still just visible over the south door of the church of St. Peter-in-the-East, now the library of St. Edmund Hall.

Many dials have been lost by weathering, or by the re-building of the walls on which they were placed. Fortunately, some have been restored or reinstated, snatched from oblivion when on the point of disappearance, and such reconstructions may still be in progress. The Pelican Dial at Corpus Christi College and a wall dial in the Fellows' Quad at Merton have undergone such reconstruction in recent years. Furthermore, a sundial is now seen as a suitable form of commemoration, and several entirely new sundials have recently been erected in Oxford. So after long diminution we may look forward to an increase in the number of Oxford Sundials.

The stained glass dials of Oxford

In the seventeenth century a number of makers of stained glass windows designed sundials to be fitted in to a window, and to be read from inside the room. The gnomon was fixed to the outside of the window and cast its shadow onto a piece of glass stained or painted a dull white, on which the hour-lines and numerals were painted in black. The design often included pictures, motto or a heraldic coat-of-arms; and several designers included a picture of a flying insect, as a visual pun on "Time Flies". Glass is an inherently fragile material, and most of these window dials have vanished long ago. Of those that remain, few are in their original place, and fewer still have the gnomon intact. Some have

been removed to museums and private collections. Of the 36 glass window dials now known in Britain, 6 are in Oxford, and at least one of these is in its original place. We are fortunate indeed that three of Oxford's window dials can on occasion be seen by visiting members of the public.

About this book

In this booklet the descriptions and photographs of the sundials are arranged in geographical groups. First come sundials near the City Centre, close to the High Street and Merton Street. Then four sundials in North Oxford are described: these include two fine modern horizontal dials, and Oxford's only armillary sphere accessible to the public. Next come two church wall sundials, west and east of the city centre. Finally I describe and illustrate Oxford's speciality, the glass window dials.

Beside the name of each dial there appears one or other of the letters P (for Private), R (for Restricted Access) or O (Open Access). Private dials may be seen only with the permission of the owner. Restricted dials may be seen when the particular building, garden or museum is open to visitors. Open access dials may be seen at any time from a street or public place.

Acknowledgements

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I also acknowledge with thanks the permission for use of photographs of their sundials granted by:

The Warden & Fellows of All Soul's College; the Principal & Scholars of the King's Hall and Brasenose College in Oxford; the Governing Body of Christ Church, Oxford; the President & Fellows of Corpus Christi College; the Warden & Fellows of Merton College; the Governing Body of St Antony's College; the Governing Body of St Edmund Hall; the Master & Fellows of University College; the President & Fellows of Wolfson College; the authorities of the Bodleian Library; the curator of the Museum of the History of Science; the vicars of the Church of St. Thomas the Martyr and of St. Cross Church.

I also thank Mr C. Daniel, Mr P. Foster, Mrs Anne Somerville, and Mr D.A. Young, who kindly lent photographs.

City Centre Sundials

Several of the sundials of Oxford Colleges may be found on or near the High Street and Merton Street. They will be described in the sequence in which they would be seen by a person walking from Carfax eastward along the High and westward along Merton Street.

BRASENOSE COLLEGE (R)

As one enters BNC by the arched gateway from Radcliffe Square, one sees a fine wall dial on the right in the first quad. The Roman numerals are painted in gold on a blue background; the hour markings are subdivided into halves, quarters and eighths. The College Arms are painted at the root of the gnomon. The wall does not face due south but declines slightly east: this explains why the dial shows more morning than afternoon hours. The sundial is in excellent condition and easily readable; though John Buchan an ex-BNC man remarked rather unkindly that the sundial is "by no means a thing for the eye to delight in".

The sundial was erected in 1719 at a cost of £9; painting and gilding cost 7 guineas. From a tablet attached to the entrance to the Hall, it is possible to calculate Greenwich Mean Time from sundial time. This tablet was devised by Professor A. Thom, Professor of Engineering and a former Fellow of the College.


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ALL SOULS' COLLEGE (P)

The interesting circular wall dial of All Souls' College was designed by Sir Christopher Wren, probably soon after 1653, the year in which he was elected into a College Fellowship. Wren was pleased with the accuracy of his design, and wrote that "one may see to a minute what it is a clock, the minutes being depicted on the sides of the rays". In fact the dial is placed so high up that it is by no means easy to read, though it is in excellent condition. The Roman numerals, lined up in the same sense as the hour lines, face outwards from the circle, an unusual placing. The College Arms appear at the centre of the dial. The motto PEREUNT ET IMPUTANTUR "(The hours) pass away and are set down to (our) charge", is from Martial's Epigrammata. A jocular mistranslation "They perish and are not thought of" was said to refer to the Fellows of All Souls'.

The dial was originally placed on the wall of the Chapel in the First Quad. It is now on the wall of the Codrington Library in the North Quad, which has the same orientation as that of the Chapel wall.


PEREVNT ET IMPVTANTVR

ST. EDMUND HALL (R)

Just off the High Street a few steps down Queen's Lane, a visitor may enter the arched gateway of a small College, St. Edmund Hall, where there is a square dial of painted wood on the south-facing wall of the Quad.

The gold sunburst at the root of the gnomon, the blue, white and gold paintwork and black zodiac symbols make a pleasing composition. The motto reads AUSPICE ELIZABETH II HORAS NON NUMERO NISI SERENAS; ("By grace of Elizabeth II I count no hours unless fine"). A small ball, the nodus, is placed on the gnomon about 1/3 down its length. The lines traced out by the shadow of the nodus during the course of certain days of the year are shown by the curved lines across the dial face. The upper curve indicates the shadow's movement at the winter solstice, 22 December; the lower curve, its movement at the summer solstice, 22 June.

This handsome sundial dates from 1953, the year after the coronation of Queen Elizabeth II, and the motto, in the words of the contemporary writer, "happily combines reverence for the Throne with a practical recognition of a sundial's limitations". This sundial replaces a wooden dial of the same size and general design but less colourful. This earlier dial was of some antiquity, and may indeed have been erected when this part of the north range was built in 1746. When in 1953 the Hall authorities decided to restore the old dial, the wood was found to be warped and rotten, so a completely new dial was constructed. The cost was met by a benefaction from Mr R.B. Pugh formerly of Queen's College, a lecturer at St. Edmund Hall.


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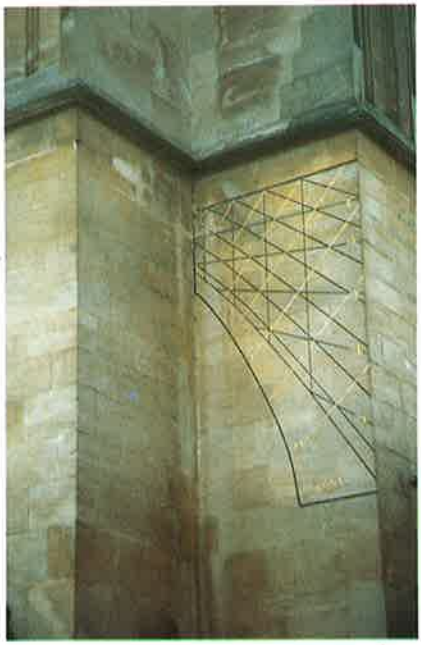
MERTON COLLEGE

Chapel Dial (R), Fellows' Quad Dial (R), Armillary Sphere (P)

Chapel Dial

Visitors entering Merton College through the arched gateway from Merton Street will see the east end of the Chapel on the right. At the north-east corner on the east face of a buttress is a sundial. The gnomon is a brass knob, the bullet, set into the projecting corner of the wall on the left of the dial lines. Since the aspect is east, the sun shines on the dial only in early mornings, and the dial is best seen about midsummer. The hour lines, with intermediate half-hours, are the sloping lines numbered 6 to 9 (a.m.) and coloured gold. The numbered sloping black lines (1-5) give the time in hours since sunrise. The four vertical black lines give the direction (azimuth) of the sun; they indicate (from left to right) 70° east of north, 80° east of north, due east, and 80° east of south.

The dial, designed in 1629, has been restored at intervals since, and is now in good condition. The designer was either John Bainbridge (Savilian Professor of Astronomy) or Henry Briggs (Savilian Professor of Geometry). The design was computer-checked - and found correct - in 1974 by Dr Geoffrey Bush, when the lines were re-cut and painted and a new gnomon was fitted.



MERTON COLLEGE (continued)

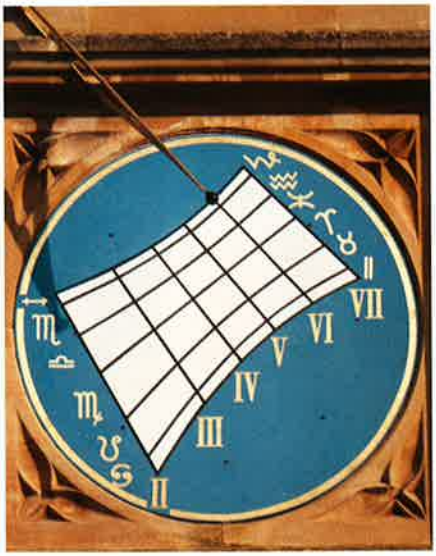
Fellows' Quad Dial

A sundial can be seen on the west-facing wall of the range of buildings along the east side of this Quad. The gnomon is a metal bracket and ball projecting from the wall, above and to left of the dial face. The hour lines with Roman numerals show the hours II to VII. The curved lines mark the passage of the sun through the Zodiac constellations during the course of the year. In the first half of the year the shadow of the ball moves gradually downwards (through the zodiac constellations marked by the right-hand symbols Capricornus to Gemini), as the sun reaches a higher point at its zenith day by day. In the second half of the year, the shadow moves upwards (constellations Cancer to Sagittarius on the left) as the altitude of the sun daily decreases.

This dial was designed in 1974 by Dr Geoffrey Bush, a Junior Research Fellow of Merton. A dial of similar basic form was present in this place in the 18th century; at this time, a corresponding east-facing dial was in existence on the opposite wall of the Quad. Both these dials are shown in Williams' prints of 1733.

Armillary Sphere

A fine sundial of armillary sphere type stands on the lawn in the Fellows' private garden at Merton. It was presented to the College by a Fellow, George Tierney, and placed on its pedestal in 1830.

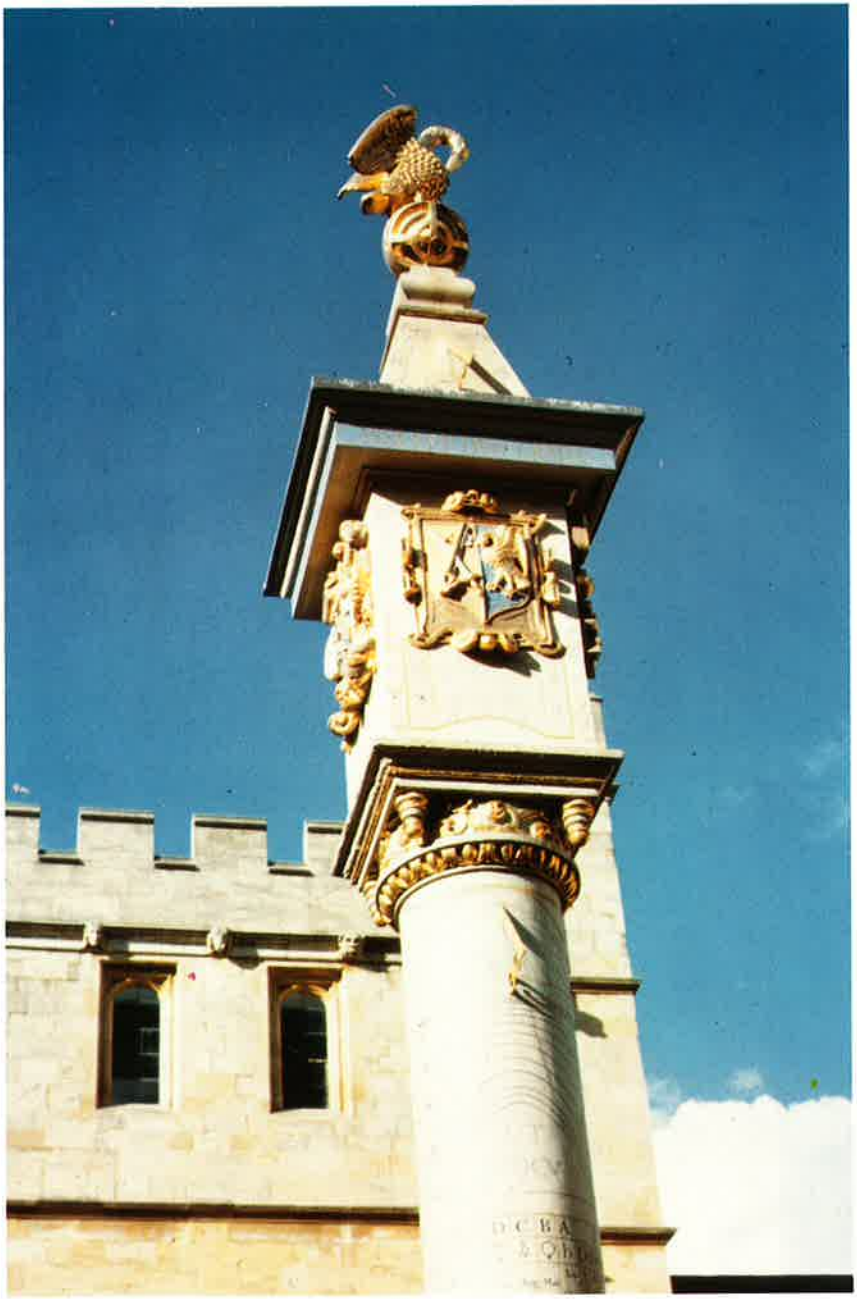


CORPUS CHRISTI COLLEGE (R)

The tall column bearing a many-faced sundial in the front Quad at Corpus Christi is the best-known of Oxford's sundials. It is affectionately known as the Pelican because of the carved pelican surmounting the pillar; this bird, a symbol of piety, appears in the Arms of the College. The sundial is more properly called the Turnbull Dial, after Charles Turnbull its 16th century maker.

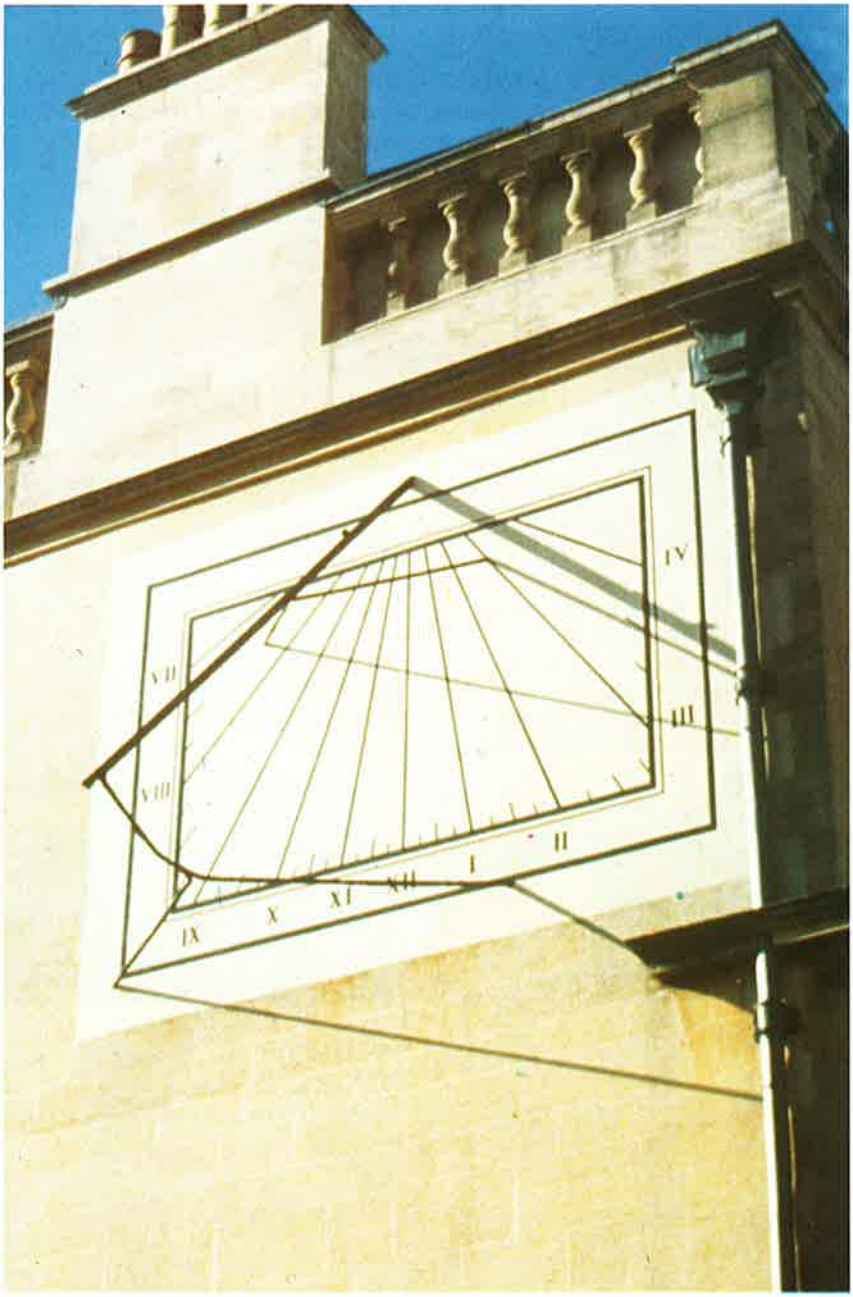
On each of the four faces of the pyramid under the ball on which the pelican stands, there is a sundial with a metal gnomon. Below this comes a stone block of square cross-section. On each of its four vertical faces there is a heraldic badge surrounded by stone scrollwork, and a projecting portion of the scrollwork below the badge acts as the gnomon for the sundial immediately below it. This gives us 8 sundials in all at the top of the column. The ninth dial is on the south side of the cylindrical pillar itself: a typical vertical dial with metal gnomon. The convex curvature of the column means that the gnomon's shadow is blurred except for the hours around noon. Below this dial are the initials of Charles Turnbull and the date, 1605. At the base of the north face of the column is the motto HORAS OMNES COMPLECTOR ("I encompass all hours").

Turnbull is thought to have made the original dial between 1579 and 1581, and the date 1605 probably refers to a time when he restored it. There was another restoration in 1625. In 1706 it was taken down to add the large square plinth below it; this was probably done to raise its height, so that even in winter it would catch the sun, above the shadow of the buildings on its south side. There was a clumsy restoration in 1817. In 1873 the whole column, then in a sorry state, underwent a more thorough restoration under the supervision of W.W. Fisher, a Fellow of Corpus. A re-painting was done in 1936 under the care of R.T. Gunther, a historian of science. A thorough restoration and repainting was carried out in 1976 under the supervision of Dr Philip Pattenden, who based the restoration on early photographs and documentary evidence from the College archives.



CHRIST CHURCH (R)

A large sundial is painted on the south-facing wall of the Killcanon building in Peckwater Quad at Christ Church. Its exact date is uncertain, but it cannot be earlier than 1756 when this quad was built. The dial face is clear and readable though not particularly handsome. The sundial is in good condition and has been restored at least once; a repainting in 1916 is recorded.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North Oxford Sundials

Wolfson College at the bottom of Linton Road (a turning off the Banbury Road just north of Park Town) has a delightful garden laid out along the bank of the Cherwell. Garden lovers are encouraged to walk around it, and a small guide book is available at the College Porters' Lodge. St. Antony's College is at the corner of Woodstock Road and Bevington Road. Somerville College is in Woodstock Road just south of the Radcliffe Infirmary. St. Giles' Churchyard is at the junction of Woodstock and Banbury Roads.

WOLFSON COLLEGE (R)

The sundial stands in a small formal garden on the south side of the main College buildings. It is reached by a walk through the west car-park, past the croquet lawn and wisteria-covered pergola, coming out beside the glasshouse. This area has been called the Oriental Garden because the plantings are of shrubs and herbaceous plants which came originally from Japan, China and the Himalayas. The design of the octagonal sundial maintains the oriental theme as the top of the gnomon is held in the mouth of a Chinese dragon. The hour lines on the dial face are numbered in arabic numerals for GMT and in Roman numerals for BST. The shadow of the nodus (notch) on the gnomon traces out lines engraved across the dial face on the days of the winter and summer solstices and the equinoxes. The gnomon stands on a compass rose, and an equation-of-time graph allows the calculation of clock time from dial time. The sundial was given to the College by its second President, Sir Henry Fisher, whose initials appear on the dial, with "d.d." - donum dedit. The motto, from Horace, INTER SILVAS ACADEMI QUARERE VERUM "Seek for truth in the groves of Academia", was chosen by the donor. The College is rightly proud of this handsome modern dial.

ST. ANTONY'S COLLEGE (R)

A large horizontal sundial is placed on a low plinth near the edge of the lawn on the north side of the main entrance to St. Antony's College. The outward-facing Roman numerals, hour lines and motto are incised into the stone, and the incisions and ornamental sunburst are painted in gold, blue and red. A sturdy brass gnomon is fixed directly into the stone. The motto HORAS NON NUMERO NISI SERENAS ("I count only sunny hours") is a favourite of sundial designers. On the edge of the plinth is the dedication: "In memory of Christopher Platt 1934-1989 Fellow of St. Antony's College 1972-1989".

The sundial was given to the College in 1992 by Mrs Sylvia Platt in memory of her husband. The dial was designed and constructed by Peter Foster. The small ornamental planting and rockery around the plinth was designed jointly by Mrs Platt, Mr Foster and Sally Tarshish, a professional gardener. We must hope that a pine tree standing nearby is not permitted to grow so large that it obscures the dial's reading of afternoon hours.


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SOMERVILLE COLLEGE (P)

A horizontal sundial of typical eighteenth century design stands in a small hedged garden in Somerville College between the Chapel and Penrose building. The gnomon stands on an eight-point compass rose, and the motto "AMIDST YE FLOWERS I COUNT YE HOURS" is a much-used couplet of sundial makers. On the stone plinth around the dial face is inscribed a dedication, "In memory of Madeleine Shaw Lefevre Principal of Somerville Hall 1879-1899".

The low-growing rock plants in the pavement around the plinth give the sundial a colourful setting.

ST. GILES (O)

At the north end of St. Giles, between the war memorial and St. Giles Churchyard, there stands an armillary sphere sundial. It is a fine piece of ironwork, with bold numerals, easy to read. The vertical ring and the equatorial ring bearing the numerals are incomplete, so that their shadows cannot obliterate that of the gnomon. This is an important though not a universal feature of the design of armillary sphere sundials.

The sundial was given to the City of Oxford in 1986 by its twin City, Bonn, in Germany. Peter Riegel whose name appears on the sundial was Chairman of Bonn District Council in that year. The sundial was made by Karl König, a blacksmith by trade, who in 1990 succeeded Peter Riegel as District Council Chairman.

SOMERVILLE COLLEGE

ST. GILES

Churches

Two of Oxford's parish churches have sundials. The Church of St. Thomas the Martyr to the west of the City is near Oxford Railway Station, down a little side street behind the Jam Factory. St. Cross Church is in St. Cross Road, a turning off Longwall Street which joins the High Street at its eastern end near Magdalen College.

ST. THOMAS'S CHURCH (O)

The Church of St. Thomas the Martyr has a wall-dial on a slab of stone above the south door into the porch. The dial is somewhat weathered and some lines are almost obliterated. Above the dial are a heraldic shield, the date "1621" and the initials "EFTB".

The south porch (presumably including the sundial) was built by Robert Burton, author of "The Anatomy of Melancholy", who held the living of St. Thomas's from 1616 until his death in 1635. Burton was "by profession a divine, by inclination a physician", and lived the life of a scholar in Christ Church. According to an early biographer, Burton was ".... an exact mathematician ..... and one that understood the surveying of lands well". So he might have been able to design a sundial. The heraldic shield is presumably that of Burton himself but the significance of the initials is unknown.

ST. CROSS CHURCH (O)

A large square dial is to be seen on the south wall of the tower of St. Cross Church. The Roman numerals painted gold mark the hours from 8 a.m. to 7 p.m.: the wall declines slightly west. The gnomon root is inserted in a gold-painted sun and the dial face marks hour lines and short intermediate half-hours. The background was blue but is now (1994) in need of re-painting.

There appears to be no record of the erection of this dial. The book by Gunther published in 1923 records it as being "still in existence", implying that it was already old at that date. A search through the churchwarden's accounts of St. Cross parish, which go back to the 18th century, reveals no mention of the erection or restoration of this dial.


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Stained Glass Dials

Three of the stained glass sundials in Oxford are in the Museum of the History of Science, at the east end of Broad Street next to the Sheldonian. The museum's opening hours are shown on a notice at the gate. Two dials are in the Convocation House of the University, to the west of the Bodleian Library. Guided tours of the Bodleian and its related buildings are arranged by the office of the visitors' centre in the quadrangle of the Library between the Sheldonian and the Radcliffe Camera.

MUSEUM OF THE HISTORY OF SCIENCE (R & P)

The Museum possesses three stained-glass window dials, herein to be called Dials A, B, and C. Dial A can be seen whenever the Museum is open to the public. Dials B and C are in the Curator's private office.

Dial A, in a south-facing window on the Museum stair case, is about 250 mm square. It shows hour lines III to IX, radiating from the bottom right corner. A goldfinch stands on a perch between the 8th and 9th hour lines. The motto VESPER IN AMBIGUO EST--AGE(N)DUM - MORA NOXIA - CRAS NIL, can be translated "The evening is uncertain-Come now! - Delay is harmful - Tomorrow is nothing." The arms (bottom right) were granted to Edward Heyward of the Inner Temple in 1611. They are described thus: "On a wreath of the colours a wing argent charged with a pale sable thereon three crescents silver".

MUSEUM OF THE HISTORY OF SCIENCE (R & P) (continued)

Dial B is a diamond shape 143 mm in height, and was made for a direct east-facing window. The numerals 4 to 9 are arabic, X and XI are Roman. Above the dial a fly is painted; below is the date 1648.

Dial C, a 17th century dial, was intended for a window facing south, declining slightly east. The Roman numerals 6 a.m. to 4 p.m. are clearly marked on a yellow border. Above the sunburst, centre top, is the motto DUM SPECTAS FUGIO ("While you watch I fly away").

All three dials were inserted into the Museum windows in 1956, when the 19th century diamond-paned windows were replaced by rectangular glass panes. Dials A and B came to the Museum directly from the Lewis Evans Collection, the foundation collection of the present Museum. Unfortunately Lewis Evans did not record their provenance. Dial C was a gift from the glazier, Mr Dennis King of Norwich.

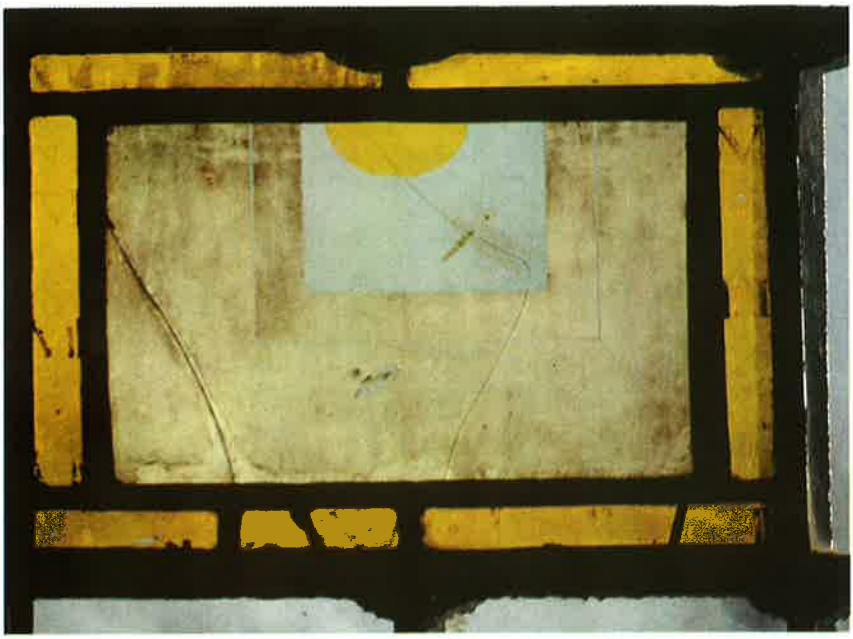
CONVOCATION HOUSE (R)

Two small stained glass dials are to be seen in windows of the Convocation House beyond the Divinity School on the west side of the Bodleian Library quadrangle. The dials are high up and in rather poor condition; the use of binoculars is suggested, for people trying to see them.

Dial A is in the south window above the Vice-Chancellor's Chair. On a dull white ground is a blue rectangle with a yellow half-sun; the faint outline of what might be a dragon-fly is just visible. On a gold border a few Roman numerals are discernable, providing evidence that the rectangle is indeed a sundial and not a mere fragment of ornamental glass.

Dial B in a west-facing window has a few faint hour-lines, in addition to Roman numerals of the afternoon hours II-VIII. Since this window has a west aspect it is not impossible that the dial was made for this site, though the window is now somewhat shaded by nearby buildings. In the top right is a spray of roses and a yellow brimstone butterfly.

The authorities of the Bodleian Library who are responsible for the Convocation House can provide no information about the origin of these dials or the date when they were inserted here. Gunther's book "Early Science in Oxford" published in 1923 gives a comprehensive list of all sundials then in Oxford. The fact that Dial B but not Dial A is mentioned by Gunther suggests that Dial A was placed here after 1923.



UNIVERSITY COLLEGE (P)

University College possesses a glass sundial, about 300 mm by 150 mm. Roman numerals, VI a.m. to VI p.m. run round the edge; in the centre is the figure of Christ holding an orb in the left hand, the right hand raised in blessing. Along the top are the words SUM VERA LUX ("I am the true light"). This dial is in excellent condition; if provided with a gnomon it would probably tell the hours with fair accuracy.

The sundial is the work of Henry Gyles of York, in the late 17th century. Gyles gave it to the college gratis on completing a large order for the east window of the Chapel. This is not the Chapel's present east window, but several planes of the Gyles east window still exist elsewhere in the College.


SUM VERA LUX

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From: The Appeal Office
Somerville College
Oxford
OX2 6HD

ERRATUM

Page 2

Line 5 : Delete ' . . turning of the earth on its axis (which gives . . '

Line 6 : Delete ' . . and shadow) '