

The Warblington Sundial

by Gordon Braddock

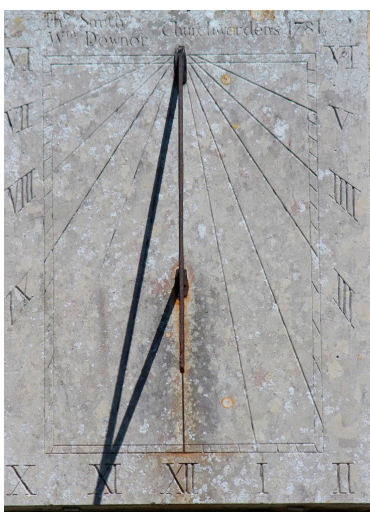
Inconspicuous on the south side of St Thomas à Becket Church at Warblington is a sundial.

In the 18th century few activities required accurate time-keeping (which was not easily available anyway). John Harrison's clocks were developed for finding longitude at sea.

Sundials were a means of estimating the time. Mid-day was marked locally as the instant the sun appeared at its apparent highest in the sky.

It is the position of the shadow of the gnomon on the calibrated dial that gives the observer an indication of approximate local time, using the zenith of the Sun as a standard marker. Since time was unified nationally adjustments are made for longitude – unless the sundial happens to lie on the Greenwich Meridian (GM)!

The sun might be expected to reach its highest apparent position about four minutes later for every degree longitude the location is west of the GM baseline, or four minutes earlier for every degree east of the GM.



12 noon British Summer Time (BST). St George's Day, 23rd April 2020. (The hour lag is due to BST leading GMT by an hour.) The technology in 1781 was impressive!

Warblington Sundial. Dated 1781, the names Thos Smith and Wm Downer Churchwardens are inscribed at the top



On 21st December 1120, close to the midwinter solstice Thomas à Becket was born. The annual date of 21st December is dedicated to St Thomas the apostle – after whom Becket was named.

On or near 21st December nowadays (and then) chances are that the sky would not be clear. If it were cloudless the shadow might be expected to lie close to the XII mark when the sun is at its zenith, as time will have reverted to Greenwich Mean Time (GMT). In practice, the Sun would be so low in the sky that trees in the south would shade the sundial!

***St Thomas day, St Thomas gray,
The longest night and shortest day***

There are no known photographs of the gnomon shadow of Warblington's sundial at 12 noon on the midwinter solstice.

The sequence of photographs on the facing page shows the sundial around local mid-day GMT on 21st June 2020. (The precise midsummer solstice was at 21.43 GMT, 22.43 British Summer Time (BST) 20th June 2020 at Greenwich.)

Note that a plumbline dropped from the base of the gnomon showed that the vertical exactly intersects the XII mark but misses the apex of the window underneath.

Warblington has a longitude $0^{\circ}59'08''$ W, 0.983 degrees west of the GM, corresponding to local solar time being nearly four minutes later than GMT – 234 seconds (3 minutes 54 seconds), to be more precise. So why is the Warblington sundial showing six minutes late?



13.00 BST
The gnomon shadow is left of the XII mark but bisects the apex arch



13.10 BST
The gnomon shadow falls on the XII mark. It is local mid-day

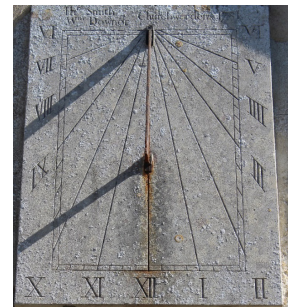


13.20 BST
The gnomon shadow is right of the XII mark

The orbit of the earth is elliptical (oval-shaped), not perfectly circular. Its axis of rotation is inclined by an amount which precesses (wobbles, like a spinning top or gyroscope). Inclination varies between 22.1 and 24.5 degrees away from the axis of its orbit which introduces a further complication.

In 1781 the church was actually dedicated to Our Lady – Mary, the mother of Jesus. The incumbent rededicated it to the martyr, Thomas à Becket in 1796, 15 years after the sundial was erected. Churchwardens would not have been aware of the pending rededication to Becket or the significance of his birthday.

On midsummer's day 2020 this obliquity was 23°26'12" (or 23.437°) which complicates matters. For precise work a correction has to be found using 'The Equation of Time' which is the variation in time shown by our clocks and sundials. A sundial can be up to 16 minutes fast and 14 minutes slow.



9.15 am BST Thursday 25th June 2020.
Adjusting to 8.15 am GMT it shows the dial has been calibrated well. The gnomon shadow (top) had just appeared as the sun emerged south of the plane of the sundial face

The introduction of clocks springing forwards for the summer and falling back for winter occurred during World War 1. It did not concern 18th century Warblingtonians.

In 2020 clocks were advanced from GMT to BST by one hour at 01.00 hours on 29th March and returned in October. Earth, Sun and sundials have no respect for this artificial time jump! Sundials will usually be an hour slow in the summer. Unless numbering on the dial is corrected to BST, sundials will give the wrong time in summer. If corrected for summer they will be wrong in winter.

5.30 pm BST Thursday 25th June 2020.
In late afternoon the shadow has reversed direction. The gnomon shadow lies at 4.20 pm GMT, suggesting the earlier time of 5.20 pm BST. The shadow disappeared a few minutes later as the sun moved north of the sundial face

