

## **The Meldreth Meridian Marker**

### **Historical Background**

A meridian is any line of longitude – the imaginary lines running between the North and South Poles. Up to the late 1800's, different meridians were adopted by different countries for the purposes of map-making, navigation and timekeeping. The earliest 'Zero Meridian' running through the Royal Observatory at Greenwich was established by John Flamsteed, the first Astronomer Royal, in 1675.

In the middle of the 18th Century the Astronomer Royal, James Bradley determined a new position for the 'Zero Meridian' and it is this one which was used by the Ordnance Survey. The most prominent of the lines marked at Greenwich corresponds to the 1851 determination by Sir George Airy, another Astronomer Royal, and it was this one which in 1884 was adopted by 25 countries at first, as the Prime Meridian for the calculation of time and longitude. As it is only about 6 metres from Bradley's, the Ordnance Survey stuck to Bradley's.

This sufficed for the definition of time until the adoption of the International Celestial Reference System 1984. This ties back to longitude through observations of satellites and quasars and is sensitive enough to detect small variations in the rotation of the earth and also tectonic plate movements. The GPS satellite system uses this system too. The Zero of longitude of this system is the International Reference Meridian (IRM), which is about 100 metres East of Airy's Meridian.

### **Which Meridian to Mark?**

Since the point of the Meldreth Marker is to celebrate the Millennium and it is also a sun clock and we expect that in the future GPS will be the dominant means of accurate navigation, it was an obvious recommendation that the IRM be marked and this is what has been done. Within the Parish the IRM also crosses Whitecroft Road and some public footpaths but the north side of Fenny Lane with its wide verge seemed the most suitable place. The position and orientation were determined by reference to accurate maps with co-ordinate transformations between the different systems being provided by the Ordnance Survey and other experts.

### **The Sun Clock**

Since our measurements of time originally derive from Greenwich Mean Time – that is, from the average solar time throughout the year – it did seem appropriate to combine the marker with a sun clock. The design is a combined vertical and horizontal dial, which makes the best use of any sunshine in winter or summer, at least between 6 am and 6 pm.

Because the sun clock is aligned exactly North-South and is also on the Meridian, it is symmetrical and tells Greenwich solar time and the only correction needed to get GMT (now known as Universal Time Co-ordinated or UTC) is the 'equation of time'. This arises because of the eccentricity of the earth's orbit and can give a difference of up to 16 minutes fast or slow, depending on the time of year. Because the dial can be estimated to 5 minutes, the effect can easily be seen. The difference is zero on April 15, June 12, September 1 and December 24 and has a maximum of 14 minutes (sun slow) on February 11 and of 16 minutes (sun fast) on November 2. On the day of the unveiling (December 4) the sun time is ahead of mean time by about 10 minutes.

## **Acknowledgements**

The concept of the marker was due to Christopher van Essen and John Rogger, who also made the detailed design and surveyed the site.

The idea was supported and encouraged by the members of Meldreth Parish Council who also voted funds for the marker as well as for other millennium projects.

The marker was made in granite by Ivett and Reed, the craftsman being Ben Curtis.

The marker was unveiled on 4 December 1999 by the Astronomer Royal, Sir Martin Rees.

## **Further Information for Enthusiasts**

The main sources of information on meridians are the National Maritime Museum and the Ordnance Survey.

National Maritime Museum, Greenwich, London SE10 9NF

Tel: 0208 858 4422

<http://www.nmm.ac.uk/>

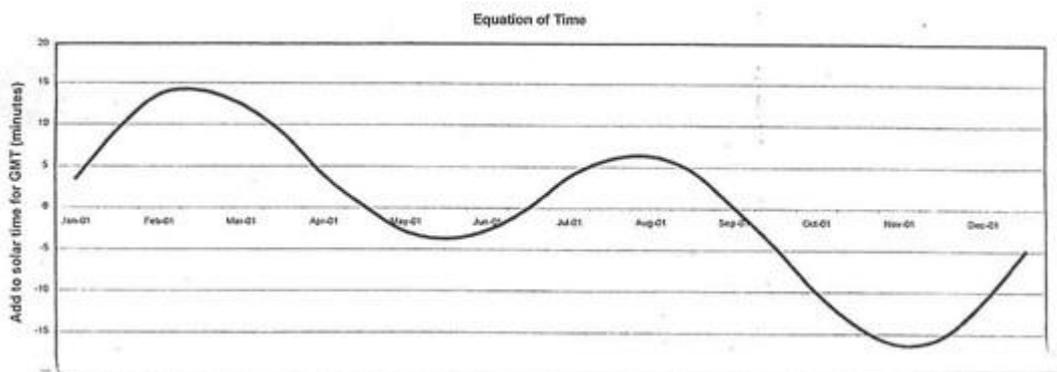
Ordnance Survey Customer Information, Romsey Road, Southampton SO16 4GU

Tel: 0345 330011

<http://www.ordsvy.gov.uk/>

There are numerous books on sundials. One with a variety of different designs which can be cut out and made of card is Sundials and Timedials by G Jenkins and M. Bear, publ. Tarquin, ISBN 0906212 59 6, obtainable from the Fitzwilliam Museum shop.

The equation of time (difference between actual and mean solar time) is approximately:



*written and produced by Christopher van Essen, November 1999*