

## THE BOROUGH GARDENS SUNDIAL

The sundial on the lawn below the bandstand is properly called an analemmatic dial and is unusual because the user forms part of the dial system and acts as what is called the 'gnomon' in other types of dial. If a person stands in the correct position, which depends on the date, their shadow will indicate the time.

To use the dial stand on the centreline running north-south on the two slabs and opposite the appropriate date. Your shadow will then show the time.

The sundial indicates British Summer Time (BST) so that if you use it during the winter you should subtract one hour from dial time.

Sundials of course show local sun time. This sometimes differs from clock time for two reasons.

Firstly, for the same reason that UK time is different to New York time, sun time in Dorchester differs from sun time in London. Dorchester is about  $2.5^\circ$  west of the Greenwich meridian and as the earth rotates at  $15^\circ$  per hour ( $360^\circ$  in 24 hours) our sun time is 10 minutes behind London sun time ( $60 \text{ minutes} \times 2.5^\circ/15^\circ = 10 \text{ minutes}$ ). This difference has been allowed for in the design of the sundial.

When people made infrequent and slow journeys this difference didn't matter much. If you lived and worked in Dorchester London time was of no great consequence but the advent of railways made it vital that all of Britain used the same time, hence Greenwich Mean Time.

The word 'Mean' is important here. The rotation of the earth relative to the sun is not uniform throughout the year whereas the rotation of clocks is – or should be.

This gives rise to the second reason for the difference between sun time and clock time. Clocks show the average or mean time whereas sundials vary during the year by differing amounts.

This difference is called the 'Equation of time' and varies from a maximum of about fifteen minutes fast in late October to about fifteen minutes slow in February. It is zero four times a year in mid-April, mid-June, late-August and mid-December.

It is difficult and expensive to allow for this in a simple sundial so most dials take no account of this variable difference. If you do wish to apply it the correct value for any particular day can be found in nautical almanacs.

The table below gives average values in minutes of the change to convert sun time to clock time for each month.

January	February	March	April	May	June	July	August	September	October	November	December
+9	+14	+9	0	-3	0	+6	+4	-4	-14	-15	-5

If you want to learn more about sundials the book 'Sundials: Their theory and construction' by Albert Waugh and published in the UK by Constable and Co. is useful. Unfortunately it predates computers so the mathematics used in it may be unfamiliar to younger readers. There are also many programs available on the internet.

Hopefully this leaflet will have shown you that, if they are correctly installed, there is nothing wrong with sundials. They are just different – and they don't need winding or new batteries!

The layout of our sundial is designed specifically for Dorchester so that any copy of it would be inaccurate anywhere else.

However as long as all dimensions are altered by the same ratio a similar sundial can be of any desired size, from one to go in the palm of your hand with a pin as a gnomon to one to fill a football field (although that would require a large movable gnomon perhaps the size of Salisbury Cathedral spire)!

*The Council is very grateful to Michael Hickman for the initial concept and design of the sundial, supervising its installation and preparing this leaflet.*