

Can your sundial really tell the time?

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**By Hugh Harris-Evans**

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"I am a sundial, and I make a botch  
Of what is done far better by a watch"

So wrote Hilaire Belloc, but is this really fair? Sundials are the earliest known form of time-keeping having been used for some five thousand years. The Greek historian Herodotus stated that sundials were first used by the Chaldeans and Sumerians in Babylonia which was part of the modern Iraq. They used vertical rods on their buildings and noted the position of the shadow to record the passing of the hours. The concept was developed by the Greeks and Romans who constructed various different shapes of dial to enable them to tell the time and the season of the year. Usually these were bowl-shaped dials with vertical or horizontal gnomons (shadow-casters) and hour lines marked in the hollow of the bowl. Over the years more elaborate designs were produced until the advent of accurate clocks when the function of the sundial became more decorative than as a reliable means of telling the time.

The question is often asked "Can a sundial really tell the correct time?" to which you will receive the Alice in Wonderland reply that it depends upon what you mean by "the correct time". Our clocks and watches work on the basis of there being exactly twenty-four hours between one day and the next but, because of the elliptical nature of the earth's orbit around the sun, the time shown on the sundial will vary according to the seasons. In February by the clock the sun is almost fifteen minutes slow, whereas during the spring and summer months it gains and loses between four and six minutes in two cycles. At the other extreme in November the sundial appears to be some seventeen minutes fast. In fact the sundial is accurate on only four days of the year, about April 15, June 14, September 2 and December 25. Some sundials include a table showing the deviation from "clock time" according to the date.

The time indicated by the sun will also vary with the location of the dial. The sun travels across the sky at the rate of fifteen degrees per hour so every degree of longitude represents a difference of four minutes from the standard meridian for the region. The angle of the gnomon also depends on the situation, so to set up your sundial correctly you need to know both the latitude and longitude of its

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location. For the United States and the United Kingdom this site can provide the information. The gnomon should be set at the angle in degrees which is equal to the latitude of your location. The sundial can then be fixed with the gnomon pointing to the Pole Star. There are various ways of achieving this, the easiest of which, is to use a compass adjusted for the magnetic variation. Further details are beyond the scope of this article, but for those interested look at this site.

If you have read this far you will have discovered that there is a great deal more to the sundial than a mere item of garden decoration. If this has piqued your interest in the subject, then you are not alone. There are Sundial Societies in countries around the world. The North American Sundial Society has details of its objects and activities on its website.

A number of sundial trails have been established. A good example is the Thames Sundial Trail in

London, England. This site lists a number of other trails in countries all over the world but only two in the United States. However the North American Sundial Society has a complete list on its website.

Two rather different designs are shown here. The first, which is commonly referred to as a Human Sundial, uses the person's shadow to indicate the time. By standing in the appropriate box for the date the shadow will show the correct time. The second is a Digital Sundial which sounds like a contradiction in terms but in reality is just a rather clever design.

Many sundials have a motto inscribed on the face. Often these are rather serious in tone and of the "Tempus fugit" variety but you also find some written in a lighter vein. Here are a few of my favourites:

The shadow of my finger cast  
Divides the future from the past

The clock the time may wrongly tell,  
I never if the sun shines well

I stand amid the summer flowers  
To tell the passage of the hours

And finally again from Hilaire Belloc:

I am a sundial, turned the wrong way round.  
I cost my foolish mistress fifty pounds!

Hugh Harris–Evans is the owner of  
where you will find further articles,  
gardening tips and product reviews.

## **Sundials - Time Keeping Through The Ages**

**By Lucy Bartlett**

You look at your PDA (Personal Digital Assistant) marveling at the versatility of the device, not knowing that our ancestors, without the digital technology to help, had mastered the art of time keeping by inventing Sundials,.

Sundials, which are the earliest known and ancient device for timekeeping were invented during the second millennium BC. China, Egypt and the Middle East produced fixed and mobile sundials during that period. To measure the time, these sundials used the height of the sun in the sky and the length of the shadow it produced.

Using horizontal or vertical shadow casters and the hollow of the bowl marked with hour lines were some of the important features of the various designs of sundials developed by Romans and Greeks. Using the altitude of the sun as a guideline to measure the time, the Romans also designed a portable ring and pillar dials.

In the first century AD, it was discovered that shadow casters set parallel to the axis of the Earth caused a shadow to fall in the same time and in the same direction during all the 365 days to make it more reliable.

In 1556, Johann Gebhart of Nuremberg designed an ivory diptych dial. During the sixteenth and seventeenth centuries, Nuremberg was famous for the collection of ivory sundials.

If the direction of South could not be found immediately then it is not possible to use a mobile direction sundial. The invention of the magnetic compass greatly helped the sundials achieve correct orientation.

During Renaissance and Mediaeval periods, sundials of elaborate designs were produced. These sundials were intended for accurate calculation of the time. Still, most of these sundials were used as a decorative item by wealthy merchants.

Horizontal dials, vertical dials, equatorial dials, polar dials analemmatic dials, reflected ceiling dials and portable dials are some of the different types of sundials made for the calculation of time. The Horizontal Sundials are mounted on pedestals and located in gardens. The vertical sundials are mostly fixed on the walls of buildings and churches. Portable dials have several variations such as the tablet dial, ring dial, shepherd's dials and many others.

One of the famous sundials in the UK is located at the Science Centre, Green's Windmill, Nottingham which was the former home of George Green, noted physicist and mathematician. The interactive sundial is admired by school students visiting the museum.

You can buy a portable East/West Sundial with a 4 inch etched brass disc, which can be used in latitudes 25 degree to 65 degrees north, for \$50. Very basic models of sundials are also available for lesser price and indeed more elaborate sundials cost a lot more.

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Lucy Bartlett is a proud contributing author. Find more articles at

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