Left: the face of a sundial in the garden at Canons Ashby, Northamptonshire. Below: Harriet James

The sun's timekeeper

For milennia the sun has been used to tell the time and one Wiltshire woman is using these ancient techniques to make modern sundials

HARRIET JAMES LAYS a plastic protractor against a small block of stone on the busy worktop inside her garage. She carefully marks a circle in pencil before choosing one of the 50 hexagonal chisels lying on a shelf behind her. Tapping gently and skilfully, Harriet chips at the outline which will shape a new sundial.

This will be one of more than 200 she has made. Alongside, are examples of work in progress – one dial featuring a butterfly, another a tortoise, while a third is a more hefty cube dial with faces to the north, south, east and west. A fourth rather bruised dial Harriet found in a scrap yard. She suspects it to be around 180 years old.

"It was made by the Elliott Brothers who were late 18th century instrument makers. It is very much in the traditional style with a compass in the middle," she says. "It is made of brass but gets its green colour from salts emerging from the copper content of the brass. This verdigris look is imitated on modern dials because it makes them look weathered."

Harriet has been a sundial maker for 20 years and in that time the weather has played an important role in her work. She will only visit potential clients on sunny days and only installs dials when the sun's rays can show them off to best effect.

Working from home in the outskirts of Warminster in Wiltshire, she crafts sundials for garden pedestals, the walls of houses and Oxford colleges, for churches and even for playgrounds. She is one of more than 400 members of the British Sundial Society, an organisation celebrating a craft that literally dates back to the beginning of time.

One of the dials in Harriet's workshop bears a quote from Philip Larkin's poem, An Arundel Tomb: "What will survive of us is love". The dial is horizontal – meaning it sits flat to a horizontal surface – and has a gnomon protruding at an angle equal to the dial's latitude. A gnomon is the part of a sundial that casts the shadow, thus showing the time.

Time zone challenges

Most dials tell local rather than clock time. The two differ because clock time is usually kept uniform across time zones. Each time zone differs from its neighbour by one full hour, more in China and Alaska. However, within each zone, the local time on a sundial matches the clock time only at one geographical location. If the dial is based anywhere else, then a correction must be added.

To tell the time accurately, the edge of the gnomon must point to the North Pole. As the sun moves, a shadow, or a spot of light, is cast on hour lines calculated by a formula and etched or carved on the face of the dial. Lines can indicate dates too, and there is one on Harriet's Larkin inscribed dial that marks 23 April, the wedding anniversary of her clients. "You can work out the date from the height of the gnomon and the shadow it casts," Harriet explains.

"Vertical dials are also common but a different formula is used to work out the hour line angles. The shadow moves anti-clockwise on vertical dials but ›

"And the time sundials tell,
May be minutes and hours. But it may just as well
Be seconds and sparkles, or seasons and flowers."

John Ciardi, ***The Monster Den***

The Droskyn sundial, made to celebrate the millennium, has views across Perran Bay in the Cornish seaside resort of Perranport

A sundial in Harriet's workshop, which is inscribed with a quote from a Philip Larkin poem

Far right: Harriet's butterfly sundial
Right: the ancient scratch sundial at St Michael's Church in Sutton, Norfolk.
Below: sundial at Roadford Lake Country Park

Harriet with the brass sundial she recovered from a scrap yard

clockwise on horizontal and equatorial dials – those whose faces are parallel with the equator."

Reclining or inclining dials might be found on a sloping roof, lying neither in line with the equator nor vertical or horizontal. Some of the most beautiful dials have hour lines marked on a stained glass window with the gnomons outside the window. Others are laid out on a ceiling where a beam of light is reflected from a windowsill mirror. Playground dials are equally intoxicating, according to Harriet. "When you walk down the central path of this kind of dial, your shadow tells the time," she explains.

Scratch, or mass, dials inside church porches may be no more than a little circle of scratch lines. The lines can seem accidental or random and be mistaken for a mason's marks. "They are not accurate because when they were made we didn't have the knowledge of how the earth tilted. But it didn't matter if the time was wrong because everyone shared it. It was just the time to go to church."

Dials in playgrounds, on ceilings and walls already have a base but others need their own plinth. For these, Harriet uses Doulting stone from Somerset, formed in the Jurassic age, or stone from the Isle of Portland, Bath or Purbeck. She also uses slate, notably Cumbrian green slate, "which looks very good on walls". The gnomons are metal because they must be sturdy. Currently, stainless steel is in vogue.

Finding inspiration

It was Seven Dials pillar in London's Covent Garden that first attracted Harriet to dial making. The original pillar, erected in 1694, was pulled down during the 1790s to deter undesirables from congregating around it. A trust set up during the 1980s commissioned Harriet's friend, letter cutter Caroline Webb, to make a complete stone replica of the monument. Harriet was inspired and Caroline taught her how to use chisels to make her own sundials.

"I am not a scientist but I like the mixture of art and science involved in making a dial. It's a proper functioning thing but can incorporate art, symbols and mythology."

The history of a dial is important to Harriet and her restoration work at Oxford colleges, where "there were hundreds of dials", is providing the material for a book describing a sundial walk in the city.

On the New College tower, Harriet carved a large dial with foot high numerals MM (to mark the millennium) inverted below the dial to signify WW for William of Wyckham, the college founder.

"Oxford was a hub for dialling, because of the colleges and their scientific knowledge," explains Harriet, who admits to being "constantly frustrated" by her lack of scientific training. To redress the balance, she uses computer programmes to check her calculations. But at the same time, she is fascinated by the way in which some makers used dials to show how clever they were at maths.

A large, prominent sundial at All Saints Church in Stamford, Lincolnshire, is currently taking much of Harriet's attention. It will be removed for restoration and display, and be replaced by a new dial. Harriet is technical consultant for the project. "Originally they were just going to preserve it but it was too high to read and if it had just been repainted it wouldn't have had a function."

Harriet often tries to persuade church authorities to preserve and replace their sundials. "Very often I lose because it gets too complicated. There are a lot of dials that need rescuing. The dial was something of beauty not just an instrument. It was scientific and allegorical but still about time passing. It was very important to put the two together." ■

• **Words:** Cath Harris

Left: the new sundial for All Saints Church in Stamford, Lincolnshire

Above: the Seven Dials in Covent Garden, London. Below: Harriet's large sundial on the New College tower at Oxford

CONTACTS

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Sundials through the centuries

The Maya people of Central America were among the first to use the position of the sun to tell the time, based on their knowledge of astronomy. About 5000 years later, the ancient Egyptians did the same, creating a 365-day calendar.

By 1400BC the Egyptians were using L-shaped sundials, turned to the east in the morning and west after midday. Sundials were used extensively in China and ancient Greece. The Romans mounted them on pillars.

The oldest known Anglo-Saxon dials are visible on the Bewcastle Cross in Cumbria and the south wall of Escombe Church in County Durham. They were made in the 700s. It was in the 1500s that sundials became fashionable in Europe and the range of designs mushroomed.

Pocket dials were made for carrying on one's person and incorporated a device for adjusting to changes in location. Today, huge sundials decorate buildings, including Taipei 101, a 101-story skyscraper in Taiwan. Mottoes referring to time often adorn sundials, some taken from Shakespeare's sonnets; others being Latin inscriptions such as *carpe diem* (seize the day).

The Bewcastle Cross in Cumbria

Photography: Alamy; Getty Images; National Trust Images