Contents of Bulletin nr. 93, 07.1 R. Hooijenga

Sunlight enters the side of the disc and exits, more or less focused, from the other end. Here, it falls on a small screen, which reads time. This is a real equatorial sundial: *everything* happens in the equatorial plane, or rather, in an equatorial plate. Figure 1 illustrates the passage of the rays in the disc, as seen from the pole: it makes little difference if the declination of the sun is zero, or maximum N or S.
This is so because the surfaces of the Perspex disc are orthogonal and because the critical angle is less than 45 degrees. For every ray, the angle of incidence i2 on the second surface is larger than 45 degrees and total reflection occurs; see figure 2.
A fixed, half-cylinder screen would block summer early and late sun, and therefore a small, rotating one was used instead. It is turned until its index is in the middle of the semi-focused beam. An extension of the index reads the hour on the hour scale.
The construction allows for adjustment for longitude and equation of time. Figure 3 explains; top to bottom read: Perspex disc, hour disc, intermediary, base plate.

Piet Hein sundial A.P.M. Sanders 16
The Egeskov castle and gardens in Fyn, Denmark, are well worth a visit. You will also find a 11 m tall sundial. Designed by Danish inventor and designer Piet Hein, this polar-aligned 360-degree helix catches the sun all day, showing a light-to-shadow terminator that moves up as the day progresses.

Wall Dial site by John Carmichael 17
A link. Sundial #52 is by Wil Leenders (artwork) and Fer de Vries (math).

Sundial by Harry Bult 17
A link to some newspaper coverage on this new and magnificent sundial. The photo shows the maker on the left and owner Wim Baartman on the right.

Peauciellier Sundials F.J de Vries 20
This is partly based on the article of the same name in Compendium 13/2 for June 2006, to which I must refer for the mathematics.
The multiple sundial in the photo was designed by Fred Sawyer on the occasion of his 35th wedding anniversary, and made by Tony Moss. The basis is a wide gnomon horizontal dial, with hour lines for summer time along the outer edge of the base. Under the gnomon is a special equation-of-time diagram.
To either side of the gnomon are sundials composed entirely of circles.
While to most of us a straight line is what you get from running a pencil along a ruler, Peaucellier devised a mathematically proven line-drawing machine. Referring to the figure, A and B are fixed. The fat lines are rigid sticks; the dots are hinges. Point P can only move in a circle about B. When it does, point Q describes a straight line. The machine transforms circles into straight lines, and vice versa.
Peauciellier's fondness for the straight line is also clear from his paper on sundials with straight hour and date lines, using arbitrary straight gnomons. This idea is used in the sundials in the next figures, taken from Compendium.
The next step further is the use of an inversion to turn all straight lines into corresponding circles. Fred used the inverse of the self-orienting example for his design. Still more general transformations are possible, as long as $y_i/x_i = y/x$ always; see the last two figures for examples of such inversions.

Position finding for sundials J.G.T.M. Taudin Chabot 25
An explanation of the different coordinate systems. Basically, WGS84 (as it is affectionately still being called) is referenced to space; ETRS89 is referenced to the European geophysical plate. RD is nominally the same as ETRS89 – there is a formal transformation, fixed over time, between the two.
Using ETRS89 has the advantage that plate dynamics do not cause a continual change of the coordinates of objects as they are moved by the drifting Euro plate. The same is not true of WGS84, and GPS coordinates do change, although for sundial hunting this year-to-year change of a few centimetres is inconsequential [However, one should be aware of the difference of just over one hundred meters east-northeast between the two systems].