

- The Houzeau monument in Mons* E. Daled 3
 The article introduces the new tri-lingual (French, Dutch, and English) Walloon sundial site (www.gnomonica.be). One of the two sundials in Mons, the Houzeau monument on Place Louise, is described here. Its plinth is 1.15 m (4 ft) wide. On its sides are a portrait of Houzeau, a telescope, and a ruler; a working mercury barometer; location data; and a working thermometer. Of the obelisk, one of the edges faces due south. It serves as a noon line, using a gilt pole style carrying a perforated disc. This gnomon also reads time on the southwest and southeast sides of the obelisk. To the top of the west and east edges are two more pole styles, which also read time on the southwest and southeast faces of the obelisk. There are two halves of the equation-of-time loop, and finally three date curves: for the solstices and equinox. Plinth plus obelisk are some 7 m (23 ft) tall. On top of the obelisk is an armillary sphere. Everything is in relatively good state. Mons-born astronomer and meteorologist Houzeau (1820-1888) published a paper on climatology as early as 1853. He became member of the Royal Belgian Academy in 1856, was a reporter in the American Civil War from 1861 to 1865, and in 1876, Belgian king Leopold II made him director of the Belgian Royal Observatory, successor to Quetelet (founder of statistics and builder of monumental noon lines in several cities). Houzeau founded the practice of daily weather reports and used the new telegraph. The monument in his honour was erected two years after his death.
- Account of the September 2006 meeting in Utrecht* Secretariat 6
 Twenty members attended. – Fer de Vries will resign as secretary in March 2007, but continue work on the website. – Some small sundials from the Kragten collection were raffled off. – Hollander congratulated with his Sawyer prize. – Van der Beld showed his equatorial dial with optical disc. – Maes studied the old drawing for the Prinsentuin sundial and solved a puzzle. – Sasbrink made another clock-like sundial (photo) and worked on the Lichtenvoorde dial replica. – De Vries showed pictures of remarkable sundials, proving that the art of dialling is very much alive. – Some ancient sundials have been brought back to life: Lichtenvoorde, Ootmarssum, Bakkeveen.
- Sundials in Russia* Editor 7
 A link to the "Sundials in Russia" web site of Aleksandr Bodyrev, Odintsovo, Russia. He has also shows his own work on the web.
- Dates, changes, miscellaneous* Secretariat 8
 Tribute to Eisinga: His portrait in bronze, made in 1928 by Adema, is displayed, now mounted on glass, on Noord street, Franeker on the occasion of Eisinga's 250th birthday.
- Azimuth diagram; Azimuth and Altitude cylinder dials* F.J. de Vries 10
 Mac Oglesby made a horizontal compass rose with a central vertical gnomon to measure the azimuth of the sun, and a date/azimuth graph with hour lines to convert measured azimuth to time. The figure shows two examples for Holland using legal time, resulting in characteristically wavy hour lines. – The combination is an indirect-reading sundial. Meanwhile, Joël Robic published a direct-reading vertical cylinder dial. The photo shows one for apparent solar time, with symmetric, non-wavy hour lines. A shadow caster is unnecessary: the dial is read at the terminator. A rubber band is handy to keep track of the date. Remarkably, the pattern for these independently invented sundials is the same. But there is more: the principle may be extended to a horizontal cylinder dial, where time is determined from the altitude of the sun. This resembles the shepherds' dial. Both types may be constructed inside a half cylinder, using the edges' shadow. This does limit the number of readable hours in the azimuth case. The inventors are not aware of any previous mention. Is it new? It is so simple – in retrospect.
- Equatorial sundial with optical disc* A.J.M. van den Beld 14
 The essential part in this sundial is a circular Perspex disc in the equatorial plane.

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 i_2 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].

The Arbour: horizontal hour plane dial and sun-map

F.W. Maes

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Pole style sundials indicate the hour plane of the sun. It matters not what type it is, whether horizontal, vertical, equatorial, polar, et cetera. When the pole style shadow falls on an hour line, the sun is in the corresponding hour plane. All hour planes intersect in the pole style. This is a special property of the pole style sundial, which is a special instance of the general hour plane, or shadow plane, sundial.

In fig. 1 a/b, the hour lines of an ordinary horizontal pole style dial are extended beyond the gnomon foot, and each fitted with its own gnomon. The central one is now taken away and its foot point used as the index for the new gnomons' shadows. When the shadow of a gnomon falls over the index, the sun is in its corresponding hour plane. – In fig. 2, the model is roofed, for mechanical and esthetical reasons.

The reflections off the shiny pole styles, as seen from some distance, describe the path of the sun along the celestial sphere, both over and under the horizon. Which part is visible depends on your viewpoint. In order to understand how this interesting property comes about, mentally rotate the world so that the pole styles are vertical. The equatorial plane is now horizontal, and the altitude of the sun above or below this plane – the declination – remains approximately constant all day. The reflection off the styles will therefore be at the same height all day. – When the horizon is visible, this sun-map property will tell you where and when the sun will rise and set.

Physicist and artist Theo Jansen described the idea in a newspaper column in 1990.

(Jansen is better known for his wind-propelled beach beasts, constructed out of electric conduit and ty-raps, fig. 5).

Two more examples of this sundial, in Groningen and in Spain, are in figs 6 and 7.

Expansion of the Royal Eise Eisinga Planetarium

F.W. Maes

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The Planetarium has acquired the use of the building next to it, where until now the Tea shop was. The planetarium itself is in Eisinga's original house, and visitors have been navigating its narrow and low corridors for the last 225 years. At least the museum will have more room in the 1745 neighbouring house. The tearoom will continue to occupy the street side of the house. Sundials could be displayed in the garden. This will make room in the Eisinga house to restore the wool combing industry in the back room, and to reconstruct the small room where the young Eise read math and astronomy and drew his sundials. – Most of this should be ready by the winter of this year.

Sundials in the Netherlands

A.G.M. Bron

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Groningen: **Midwolda 01**. A minimalist equatorial dial, 30 cm dia, wood, concrete base. Orientation off by 15 degrees! By Westerdijk of Noordbroek, 1993; needs more attention.
Warffum 01. Armillary sphere, 49cm dia, gilt; equator, tropics and arctics. Local apparent time. Good condition, except that some rust appears from under the gold leaf.
Zuidwolde 01. Isocline dial: flat dial face, 68x10 cm with equidistant hour lines. Cycloid shadow caster, 7 cm wide, ends 62 cm apart. Central European time: EOT loops on all hour lines. Triangular stainless steel plinth is 1 m tall. Design: R. and W.J. Sanders. Construction 1990: Elbo.

North Holland: **Enkhuizen 01**, do-it-yourself passers-by Analemma project: *removed* because of vandalism problems.

Enkhuizen 02. Armillary sphere, 100 cm dia. Equator and tropics. VII to VII, the "I" is in the meridian. Brick plinth, marked 1897-1947 to commemorate the 50th anniversary of Snouck Van Loosenpark.

South Holland: **'s-Gravenhage 24**. Monumental horizontal terrace sundial, 15 m diameter. Multicoloured 7 m gnomon, 15 cm thick. Roman numerals, every hour; 1 m tall. No hour lines. Central European summer time. Built 1998 by M. Klomp. Note the incorrect spelling of Roman IV, IIV, IIIV for 6, 7, and 8.

Foreign sundial societies

D.L.J.M. Verschuuren

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An up-to-date list of addresses and other contact information of other Sundial Societies, compiled by our Flemish colleagues, and with thanks to all the spokespersons involved.

Catalogue of fixed sundials in Österreich
 An advertisement.

Gnom. Soc. Austriaca

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