Summary of the May 2003 Bulletin, nr. 82

R. Hooijenga

The meeting of 18 January 2003 Secretariat 5

Twenty-two members attended. President Coenen discussed the 25th anniversary celebrations. De Vries announced the new website and the CD with all the Bulletins of the last 25 years on it. – The Translation Rule was explained using a large ball, painted with meridians and parallels, and a small sundial. Any sundial, however oriented, may be translated to one spot on earth where it is a horizontal sundial. – Roebroeck brought slides on his sandbox project: volunteers turned the 12m (39') diameter sandbox into a brick sundial with split EOT loop. – He also brought his armillary sphere, constructed by W. Westra (brass, stainless steel and plastic). Eugènes design incorporates an EOT correction wheel. – Van der Hoeven explained how the Foster Point sundial design is exact, unlike the Yabashi Point design which is an approximation. – Verschuuren found the sundial featured on a 1991 stamp. It is "proper" sundial, an easterly decliner on a wall. – Taudin Chabot showed some Ipacity paper kits he built. He also had an offline snapshot of our website on his laptop for people to have a look. – Hollander brought samples of his business presents. After the sundial drinking glasses of last time, he showed some metal models now. See also www.analemma.nl. He is also making a 6m (20') spider dial in Lelystad. – Lidi Schoorel tallied tens of kinds of "north" in literature. We managed to condense them to true, map, and magnetic north. – A care centre in Coevorden ('cow ford') will get a 3x3m (10' sq.) sundial. The date lines will depict the brook, with the ford in the middle. Ceramic tiles will form the hour points. – Hans de Rijk gave away quite a few copies of his "Impossible Worlds". In a raffle, about half of those present won a copy.

The Annual meeting of 22 March 2003 Secretariat 8

Twenty-one members and a guest attended. – In January, Mrs. Stien Hagen, widow to the late Marinus Hagen, passed away. Marinus Hagen founded the Zonnewijzerkring in 1978. – The Zonnewijzerkring, or (Dutch) Sundial Society, celebrated its 25th anniversary on 11 March 2003. Its Bulletin was globally the first regularly appearing magazine devoted entirely to sundialling. – Coenen reported that the Utrecht Dom tower will get a sundial on its balustrade, but not on its wall. – De Vries was re-elected as member of the board. – Bron will succeed Coenen in writing the Sundials in The Netherlands column. – and so ended the official part.
De Vries reported on the completion of the Apostolic Society's analemmatic sundial. – Sasbrink showed photos of a tombstone dial. – Louwman pointed out that the annular eclipse shadow of 31 May 2003 will move from east to west instead of the usual west to east. This is because the path is near the North Pole. – Van den Beld and Nieuwenhuis reminded us of the Mercury transit of 7 May 2003. Nieuwenhuis mentioned the farmer-astronomer Arien Roelofs, who witnessed four Mercury transits, possibly a record. – Van der Hoeven was making a self-orienting sundial for his garden trolley. He used a combination of a Foster Lambert dial and a Yabashi dial, using a single circular scale but an elliptical gnomon combined with two pole styles (see also B03.1). – De Rijk pointed out that a CD box makes a fine combination sundial- equatorial, vertical, and horizontal. He also wondered why the shadow of the Nicolaas Church pole style is so badly readable. The rod may be too thin for the dial. – De Vries had photos of a local sundial by Chris Doomernik, and of the 1730 plans for the Prinsenhof sundial in Groningen! – Hollander designed a square, semi-annually split readout, azimuth sundial.

A new sundial in Vlissingen A. Schoorel-Goedhart 17

This is the analemmatic dial of the Apostolic Society. Their new church and the sundial were commissioned on 16 March 2003. Twelve year old Kevin van der Veen read the time at 12:25 hours.
The hour markers, 6 through 21, lie on an ellipse of 4 by 5.11 meters. Near the stone date scale, there is a separate stone slab with directions for use. Triangular stones around the date scale represent the four points of the compass. The area around the sundial is paved with square bricks. The surrounding buildings prevent the dial from being fully sunlit at all times. On Saturday 15 March 2003, the dial could be read from 10:15 until 16:00 hours. Towards the summer, the irradiation will become more favourable. – Calculations by A. Schoorel-Goedhart and F.J. de Vries. North-South line marked out by A.J.M. van den Beld.

An Introduction to Gnomonics, part 3 F.J. de Vries 18

A good, general definition of a sundial would be "An instrument indicating functions of the solar co-ordinates" (Deutsche Gesellschaft für Chronometrie). One of these functions is time.
Skipping a large part of history, Fer starts with the modern pole style dial (from the mid-15th century). On a horizontal sundial, the angle between the style and the dial face, called *style height*, is equal to the local latitude. Under the formalism of Fer's co-ordinate system, this would be a negative value for southern latitudes. The perpendicular projection of the style on the dial face is the *substyle*.
Now Fer switches to an equatorial plane perpendicular to the pole style, defines the hour lines and their counting, and calculates how many are needed with the famous cos T = - tan f . tan d.
Noting that every mathematical plane defines two sundials, Fer constructs lines on the other side as well. This would be an equatorial winter dial. – From the equatorial dial, through the hour ring, Fer arrives at the armillary sphere. Over time, many more rings have been added to this design representing the equator, tropics, arctic etc.

Extending the hour lines of the equatorial dial to the intersection of the matching vertical and horizontal planes, we find the horizontal and vertical sundials. Fer's strict formalisms tell us automatically that on the vertical dial, in the Northern Hemisphere, the hour numbers run counterclockwise.
This instalment concludes with the construction of a paper model of an instructional combination three-plane-sundial from thin cardboard and a sate stick.

Bifilar sundial with moondial: Genk nr. 7 F.W. Maes 23
A detailed description of this particular bifilar or "two-wire" sundial by Rafael Soler i Gayà. In general, bifilars read the time at the intersection of the shadows of the two wires (or any other shadow devices). The 'wires' may be straight or curved. The photos show some examples. Genk 7 has a normal style triangle, but the date is read at the intersection with the shadow of a chain. Because of the catenary, the equinox date line is not straight but curved. – The chain curve or catenary is the shape an infinitely supple string, when suspended between supports, would assume. The general equation for a catenary is $y = y_0 + a/2\ (e^{x/a} + e^{-x/a})$, or, if you prefer, $y_0 + a \cosh(x/a)$. Here, $y_0 = -37.67$ mm and $a = 107.67$ mm.
The moon dial looks quite frightening, but the author explains its use. The moon dial reads apparent solar time, not "apparent lunar time" as the visitors' information would have it.
The database of La Societat Catalana de Gnomònica lists no less than 34 sundials by Rafael Soler.

Eble's Horoscope F.J. de Vries 28
Over time, possibly starting with the Navicula de Venetiis, several altitude measuring sundials were invented. We know Capuchin, Regiomontanus and Apian card dials. Fred Sawyer described a hitherto unknown type, called "Eble's Horoscope". This patented design uses a different arrangement of the necessary scales. A picture shows an L-shaped arm aimed at the sun, a leaded string, and a combined latitude and hour scale, set to the correct date.
The relation between hour angle t and solar altitude h is: sin h = cos t cos f cos d + sin f sin d. Fer now proves that the construction of the Horoscope does indeed embody this equation.
An advantage of this construction is that the readout is better as no bead is used. However, the instrument suffers from the usual altitude card dial drawbacks and no commercial version is known.

The Snellegem Mystery solved F.J. de Vries 33
The Snellegem, Belgium dial is a marble slab with a number of small horizontal dials for various cities and one large one for local time. Obviously, the smaller dials all have a style for the latitude of Snellegem, but their hour marks differ. The large style has been somewhat of a mystery – it was not obvious how it was used. Some speculated that it was moveable, as in a shadow plane sundial.
This riddle is now solved. As 'luck' would have it, the large style had come off, enabling some playing around with it. As it turns out, the style should go on the other way round to make a perfect pole style.
That way, the support still looks a bit odd, but recently, a second sundial by the same maker was found – it uses the same support structure.

The 1730 plans for the Prinsenhof sundial found F.J. de Vries 35
One of the archive records of the Frisian Museum has the caption: "A drawing of a sundial with calculations (1730), made for William IV, probably for the construction of the sundial in the Prinsenhof garden in Groningen". If we compare the plan to the present Groningen sundial, it is clear that the basis has remained the same. The empty space in the bottom right was actually filled in with the design data and the names of the makers, J. Doornbusch and G. Cramer; the motto over the sundial was not yet in the drawing. However, the different kinds of lines on the sundial are clearly recognisable in the drawing.
For more on this sundial, see the Sundial of the Month for March 2003 on our web site.

'Nothing beats Groningen' (2) E.L.H. Roebroeck 36
Eugène, less optimistic about the Groningen sundial pool than some, has some advice on the subject of the Aduard dial. It is currently misaligned by almost a half-turn and could use two more hour lines.

Literature, 1459 t/m 1470 D.L.J.M. Verschuuren 37
A few that tickled my fancy: *1459.1 Horsedrawn Time Transport for Differential Longitude Determination*. The Russian government had 68 chronometers transported from Hamburg to the Pulkowa observatory, in order to determine the difference in apparent time, and therefore, in longitude. That of the Hamburg observatory was already accurately known. *1459.5 Polar dial with accentuated surface*. The dial face could vary in height to consider the equation of time. *1461.1 Dear Sundialfriends!* K. Schwarzinger is going to digitize the slide collection. *1461.3 The 2002 contest*. The problem: how should a plane sundial, at 50° latitude, be oriented in order to receive sunlight equally long each day? *1468.1 A slip of the chisel*. Apparently, Rohr mixed up his signs in his sundial on the Maison du Cadran Solaire (Sundial House). Is that what the article says? *1470 "Home" magazine, article "Sunshine is on time"* by Judith Bakker. She refers to De Zonnewijzerkring and gives the secretary's address. Among 21 photos is one of a sundial by Holman and one of a dial by author Verschuuren.