

Contents of Bulletin 94 May 2007

- Excursion: Province of North Holland* *D. de Groot* *i*
This is an invitation to join the trip to Haarlem and environs.
- Secretariat change* *Committee* *iii*
Hendrik Hollander succeeds Fer de Vries as Secretary to the Zonnewijzerkring.
- Fer de Vries resigns committee membership* *H.J. Hollander* *3*
As of March 2007, the Society has a new Secretary. Fer was secretary from 1988. He was treasurer before that, from 1979 when he had been a member of the Zonnewijzerkring (which he joined immediately after Hagen founded it in 1978) for just one year.
Fer has always followed national and international developments closely, making them accessible via the Bulletin, and later through the website.
In recognition of his work, the assembly made Fer an Honorary Member. In addition, chairman Dik de Groot presented him with a certificate of appreciation, as well as a bouquet and a bottle of gin.
- January meeting* *Secretariat* *4*
Secretary De Vries counts 21 attending the meeting. – De Vries calls for contributions to the website, notably the “work of members” section. – Horikx asks for commentary on his three essays on sundial theory. – A request for help with a garden fair in May. – Sasbrink found the origin of the stone mason’s sign on the Sibculo dial fragments. It belongs to Van Mynnesten and is also found on some churches in the vicinity. It means that the Sibculo dial dates from between 1460 and 1500. – Sasbrink talks about his email exchanges with a Russian dial maker, and about materials used in dial making. – Verschuuren owns a large drawing of the equation-of-time loop in the Gemert monastery. He is trying to find more information through the Jesuit provincial archives. – Schoorel inquires about suitable paints for the upkeep of the Vlissingen analemmatic. – De Rijk wonders if a sundial exists where the dial face’s inclination moves with solar declination. – Wilbrink was at the Philips Collection auction at Sotheby’s. A 1786 armillary (picture) changed hands for € 17k. – Wilbrink and Hollander are helping with a 4-day garden fair, and would like to see the Zonnewijzerkring represented. – De Vries talks about a new azimuth dial design by Joel Robic of France (see the January bulletin). – Roebroek shows some of his plans for a didactic sundial.
- Annual conference and March meeting* *Secretariat* *6*
Chairman De Groot welcomes 20 members. – De Vries refers to a sundial article in a garden magazine. Hollander’s material is well worth reading, but the magazine’s editorial additions leave much to be desired. One horizontal dial even has the hours running the wrong way around. – Secretary’s and Treasurer’s report approved. – Fer de Vries resigns as Secretary, Hendrik Hollander is elected in this function. – De Vries is made Honorary Member.
Louwman suggests The Zonnewijzerkring congratulate Sir Patrick Moore on his 50th year of “The Sky at Night”. We will. – Louwman mentions the Leiden symposium on 30 March, honouring of Hans De Rijk and his contributions to several publications as well as his well known books, for example on Escher. – Maes talks about the Leerdam glass sundials; more on this in the article below. – John Carmichael experimented to find the best gnomon shape; Maes shows the results. – Sasbrink shows pictures of Russian sundials, from his email contact with a Russian dial maker. There are also pictures of dials from our own expeditions. – De Vries shows how the Oglesby/Robic dials now show Babylonian and Italian hours, and mentions the second Sawyer dial celebrating his (Sawyer’s) 35th wedding anniversary in 2006.
- Members, dates, changes* *Secretariat* *8*
Please note the erratum. In B 2006.3, p22, strike the “2” in the denominator.

The Line of the Sun, exhibition in Italy *P.J.K. Louwman* 8
 Giancarlo Truffa's invitation tot the exhibition, spotted and translated by Louwman.

Another special bifilar sundial *F.J. de Vries* 9
 New bifilar sundial designs keep mushrooming. Here, the 'filaments' are a half sphere on the dial face and the extension of its vertical axis. The latter by itself is an azimuth dial, and the half sphere provides the date information. The combination is particularly easy to read.

Dedemsvaart – Sibculo *Dedemsvaart regional press* 10
 Member Sasbrink discovered that the sundial from the 'Great Galilee' Cistercian monastery is likely to be by the artist and stone mason Johan van den Mynnesten of Zwolle (1425-1504). The dial, of which only fragments remain, was a vertical direct south dial for a latitude of 52 degrees.
 Van den Mynnesten's mason's sign was also found in and around churches in various cities. He travelled through Italy and Germany and knew Dürer, who had made sundials like this before. The type was invented in the early 1400s. An example from 1463 is the one on the Utrecht Jacobi church.
 The Sibculo dial was made in the second half of the fifteenth century.

The Royal Leerdam crystal sundials *F.W. Maes* 11
 The Crystal Works have made, over the years, three sundials, intended as promotional gifts: a small rectangular vertical dial, a cylinder dial with slanting top, and a hemispherical dial. The first two cannot be exact, but do work reasonably well. The hemisphere dial is exact.

The block (by Van der Marel, based on a design by member Taudin Chabot) is an azimuth dial. Maes' first impulse was that it must therefore be quite awful as a timekeeper, because the azimuth, for the same hour, is so much more north in summer than in winter, especially in morning and evening hours. However, calculation showed the error to be far smaller than expected. A moment's consideration solved this riddle: the sun is higher in summer than in winter for the same azimuth. The angle of incidence with respect to the normal is therefore greater, and the rays undergo a larger deviation. This altitude-dependant refraction counteracts the spreading of the hour lines in summer. Thibaud's original design was a nodus dial. Maes calculated hour lines for this case, using ZW2000 by Fer de Vries. ZW2000 will handle other media than air, but only for horizontal dials. The block is equivalent to a horizontal dial on 38 deg South.

The truncated cylinder (still available) was described earlier by Ton Bron. He also found the principle of operation "not done". But this dial uses the same principles as the block, and it turns out that the error is generally within a quarter of an hour, although it can reach values of up to half an hour on winter mornings.

The hemisphere was developed in cooperation with Lt. Simonis and Lt. Binnendijk of H.M. Navy. In this sundial, the sunlight is not refracted because it is always perpendicular to the glass surface. After reflection in a small patch on the bottom, a spot of light falls on an equatorial band on the spherical surface. The patch is given an elliptic shape in order to make the spot come out circular (at zero declination) or nearly so.
 This expensive sundial was often taken as a gift on state visits. The hour band would be specially calculated for the location of the receiver of the gift.

Piet Hein sundial again *F.W. Maes* 16
 This sundial in the Egeskov garden is a one-turn helix with its axis parallel to the axis of the earth. The hour angle of the sun decides how much of the helix is in shadow. The shadow border moves with the passage of time. Every 15 degrees along the helix corresponds to one hour. Piet Hein uses the middle part of the helix, and the scale runs from 6 to 18 hours.

John Moir tested the idea, using a twisted rubber band. He observed the 12 hours LAT shadow on the autumnal equinox. Immediately after, he tipped the test dial 23.5 degrees north and south so as not to have to wait for the solstices. See fig. 2.

On the equinox, the shadow edge is square to the axis and through the '12' mark. On the west side, the shadowed part of the helix is over this point; on the east side, under it.

Around the winter solstice, the west shadow border is quite fuzzy. As far as can be made out, it still goes through the '12' mark, but it is no longer square.

At the same time, the east shadow is sharper than on the equinox. It is still square to the axis, but does not go through the 12. It indicates about 12.25 hours.

The same effects occur around the summer solstice, except that the sides have changed roles and the sharp west shadow indicates about 11.35 hours.

These effects can be understood if we consider the helix surface to be made up of many small rods, all fixed to the axis and at right angles to it. At the equinox, with the sun normal to the axis, one last rod is just illuminated by the sun, the next rod remains dark.

The shadow is square to the axis and reasonably sharp.

Around the solstices, the sunlight falls on the rods at an angle. Where the edge comes forward, it casts a sharp shadow on the strip, but it falls past the correct hour. The error depends on the strip's width in relation to its pitch. Art Carlson calculated 40 minutes, slightly more than Moir reported.

The rods represent a saddle surface, convex in one direction, concave in the other. On the other side of the strip, the sun grazes against a number of rods in the convex direction, making the shadow fuzzy and skewed.

Tear-jerker

F.W. Maes

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A sundial article in the March issue of one garden magazine was headed "Help! The sun is off!". Although its author had consulted our member Hollander, most of the article was quite off as well. Some designs were really awful [I like to call them "undials" – RH].

What are we to make of the compass card, advertised as "terracotta and glazed tile sundial"? Or of the DIY Home Depot dial, indiscriminately recommended – so much work, for a sundial for not just the wrong latitude, but even the wrong hemisphere.

Roofed spherical sundial

F.J. de Vries

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The photo shows a sundial in the Madrid National Archaeological Museum. It appears in Gibb's *Greek and Roman Sundials* under nr. 2020. She calls it a roofed spherical sundial and suspects Vitruvius called it a *plinthium*, although she is not sure.

The figure from Gibb's book shows a cross section. A hole at O, through which the sun shines on the inside scale, is the nodus. There are hour lines for antique hours, as well as solstice and equinox lines. The next figures show a front view and a view from the east. Randy Hess' "Sun Sphere" sundial is based on this sundial type (see B2001.1 p16-17).

Special azimuth sundial

F.J. de Vries

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Fred Sawyer made a new and very special sundial which he calls "An Osculatory Sundial". Fer de Vries explains.

To osculate is Latin for "to kiss", but also refers to a mathematical property that two curves may have. In this sundial, the meaning is: to be tangent to each other. [In general, curves may osculate to any degree of derivative. Usually, two curves are said to osculate if they are tangent and have the same radius of curvature in that point.]

An example (fig. 1) is the 1980 polar dial by Thijs de Vries, the first use of a curved gnomon. The gnomon shadow grazes the current hour line. A more recent example (fig. 2) is a dial by Bernard Rouxel.

The Sawyer dial is not polar but horizontal, measuring azimuth. Sawyer uses a linear time scale and a vertical gnomon.

If the gnomon is kept always on the correct hour point, all the resulting shadow lines have a common curved envelope (fig. 3). The shape of this curve depends on the date. Fig. 4 shows a family of date curves through the year.

In use, one places the gnomon on the time scale in such a way that its shadow will be tangent to the proper date curve. The gnomon foot will then be on the correct hour point.

In Sawyer's dial, there are two time scales and two sets of date curves. They are placed so that the whole looks like the image of a chalice. To complete the 'burning chalice', Sawyer added the hart-shaped EOT figure from his previous design.

The holy line

E.L.H. Roebroek

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This "remarkable expression" describes the east-west line laid out prior to the construction of a church. In the Middle Ages, this may have been done using sunrise on March the 21st. Should the sun not have been visible on that day, one would have had to wait until a later date, with the result that the "holy line" would not have been exactly east-west, and the long wall would not face due south but "east" to a certain extent. As far as Roebroek knows, there is no mention of "westing" anywhere in the records. This could mean that the sunrise on September 23rd was not often used to find the Line.

Sundials in The Netherlands

A.G.M. Bron

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Corrections: 1) Midwolda 01 is not 9681 (that was the ZIP) but 1086. 2) 's-Gravenhage 24: XI (23) is incorrect, and should read IX (21).

Groningen – Groningen 16. A classic vertical east decliner, 2.5m x 1.3m (WH). Roman numerals, LAT, VII to III. Dated 28 June 1997. Motto: "what time does not solve, is not a problem". No maker's details. In reasonably good state.

Drenthe – Eelde 01. Museum of contemporary figurative art De Buitenplaats ('The Country Estate'). The photographs show the estate's Orangery and the sundial in the dormer. A vertical east decliner, 1.22m square. Gilt woodcarving. Roman numerals, LAT, from VI to IV, subdivided in quarter hours. Notice how the gnomon supports slant to guide rainwater away from the dial face. Completed in 2005. Eugène Roebroek; woodcarving by Robert, painting by Hut, gnomon and precision supports by Westra. The sundial is in excellent state.

Coevorden 02. Care Centre De Voorde ('The Ford'). For a full description see B84.3 p32, summarized in B85. Note the use of a circular disk nodus, parallel to the dial face. Its shadow will remain circular. This vertical, slightly east declining sundial measures 3.4m x 2.4m and is placed some 10m high. Roman numerals on square ceramic tiles of diminishing size, VII to VI. Solstices and equinox. Design and realization by Bote Holman, 2003. Ceramics by mrs. Do Bloemen van Lith.

Overijssel – Enschede 17. The showpiece of the Natura Docet exhibition, this was a not-to-be-missed item on our 2006 excursion. It took a entire year to finish the 75 kg sundial, which is removable from its ornate base. All furniture is milled or cut in the 18 mm wood dial face. The gnomon (with the initials of the owners), sun and hour glass are gilt brass of 4 and 5 mm thickness. There is a combined EOT plus longitude adjustment table.

Vertical west decliner, WH 1.22m (1.74m including the base) x 1.84m. Roman numerals, LAT, IX to VII. Arabic numerals, 9 to 7 (19), around the sun. Date lines for the zodiacal signs. Horizon. Motto: Enlightenment comes with time.

Designed and made (2005) by Harry Bult for his neighbour Baartman.

La Meridiana again

H.W. van der Wyck

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This sundial appeared on a *Zwolse Courant* photo page on public clocks. In 2005, the dial was declared a monument. Records show that it was placed in 1754, on the order of Burgomaster Waterham, on a house on the north of the market square. The painted inscriptions "Anno 1754" and "La meridiana" are of later date.

Equation of Time and Declination

T.J. de Vries

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