

**Bulletin 03.3** English summary

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Members, dates, internet, various	Secretariat	3
Another new member and two address changes. Meetings 2004: 17 January, 20 March, 25 September. The summer excursion will be on 19 June. - A reference to a Web page concerning the Yin-Yang symbol and its relation to noon shadow length. - Fer found a description of a build-it-yourself heliodon, see the web address. Another model is shown on page 7 of the Bulletin. - The town of Ootmarsum now offers a Zodiac Walk. The twelve signs of the zodiac are depicted at or near twelve workshops. - Our Web site attracts many visitors from all parts of the world. - A double sundial, redundant when a tower clock was installed, served as weight for it - Picture of the Mars sundial - Member Jan Schepman is trying to save Middelburg 3 and to have Vlissingen 2 repaired; is Delft 4 still in place?		
Heliodon, drawing US Patent 6523270 B1	F.J. de Vries	7
Sundials in The Netherlands	A.G.M. Bron	8
Ton Bron is the new editor and archiver of Sundials in The Netherlands. He is successor to Wiel Coenen, who has held this position for the last eight years, after Marinus Hagen, founder of the Society.		
Van Renswoude Foundation sundial	D. de Groot	8
One of the sundials on the Utrecht Sundial Walk is on the rear of the Van Renswoude building, and care should be taken to respect the privacy of the residents.		
Middelburg 2 restored and back in place	J.T.H.C. Schepman	9
This vertical decliner, 3m wide and 4.5m tall (10' x 15') is back on its location on the Middelburg city hall front. The 1729 dial was repainted and gilded and had its wood engravings restored.		
Sundials in Schiedam and Rotterdam	J.M.J. Maaskant	10
In 2001, work was started on the modernisation of 241 post-war houses in Tuindorp, Schiedam, under the motto: "Grey to Yellow". A large sundial was unveiled on the completion of the project in 2003. It is on the front of one of the houses. - Two other pictures show the 1970 sundial of the Rotterdam Medical Faculty.		
Committee vacancies	W. Coenen	11
The author, committee president, would like to resign his function in March and calls for candidates.		
Forewarned is forearmed	H.W. van der Wyck	11
Mr. Coppes was burgled, but only valuable clocks were taken - from one clock under repair, the loose parts were gathered. Mr. Coppes thinks the thieves got his address from his email response to an advertisement offering a tower clock for sale, because the advertisement disappeared and the email was never answered.		
Ship's local time	H.W. van der Wyck	11
Mr. Plessen, while on m/v Nedlloyd Nassau, observed the captain's time keeping practice. Ship's local time is often kept to read 12.00 at local noon.		
Twenty-fifth anniversary <i>De Zonnewijzerkring</i>	D. de Groot	13

The Utrecht Academy building was home of the official part of the fifth lustrum celebration on Saturday, 28 June 2003. Present were, among others, Mrs. A.H. Brouwer-Korf, Mayor of Utrecht; Julien Lyssens, president and Jan de Graeve, vice-president of the Flemish (Belgium) Sundial Society; and Klaus Eichholz of Arbeitskreis Sonnenuhren. After speeches by president Wiel Coenen and by the Mayor, Mr. Lyssens presented a book by Coen van Climpert. Next was a talk by Fer de Vries on twenty-five years of sundial life. He recalled initial doubt if anyone would show up for Society meetings - "not a dog will show up" is the expression here - but attendance has always been good. Fer also mentioned the development of the curved wire bifilar by Thijs de Vries, and of the latitude-independent sundial and the concept of the equatorial projection dial family by Hans de Rijk.

After refreshments, at 14:48 MET, Mayor Brouwer unveiled the new Dom sundial the Society presented to the City.

Then on to Buurkerk, where a replica of an old vertical dial was painted on the front. After that, University Museum and the new armillary sphere by Gerrit Sasbrink. Curator J. de Haan thanked Gerrit but told us that the Borsje noon dial, originally on Bilt Street, was not quite ready yet.

The Museum has several fine sundials on display, and several members had a look inside. Some also went outside and visited St. Johns and the Van Renswoude Fund building. Finally, a snack and another drink in the Museum garden concluded this pleasant day.

The author adds thanks for the efforts of not only those already mentioned, but also Jaap van Dort and Dees Verschuuren.

Utrecht now has three more sundials, and when the noon dial is in place, even four, for a total of twenty-four sundials - a good second place after the capital Amsterdam.

Bifilar sundials with negative wires F.J. de Vries 16

The horizontal bifilar sundial with two crossing wires as a shade device was invented in 1923, by Hugo Michnik of Germany. An entirely new idea of Thijs de Vries was to replace one of the wires by a bent wire. It became possible to construct entirely different hour line patterns, and even to realise particular patterns, such as parallel hour lines or parallel date lines. Nevertheless, all these alternatives still have one main point in common: both wires lie on the same side of the hour line pattern.

Fabio Savian separates the hour line pattern from the reading surface and places the two wires in front of, behind, or on either side of the hour line pattern. He refers to this as "positive" and "negative" wires.

In his drafts the wires are always straight and parallel to the hour line surface, but the wires do not have to be at right angles.

An example here is shown. In front of the hour line plane is the positive wire, g1; behind it, the negative wire, g2. This second wire lies in a surface on which the sun projects the hour lines and the shade of the positive wire, and on which the time is read.

In the future, we hope to be able to report more concerning these bifilar gnomonics.

Genk #4: Polyhedron sundial with EOT F.W. Maes 18

An amazing example of didactics, this object incorporates all basic types of pole style dials: four vertical dials on the sides, an equatorial and a polar dial on the "roof", and a horizontal dial on the extended base. Design: Willy Ory, artwork: Anja Roemer (and not Römer or Romers).

All the constituent dials except one read standard or summer time without EOT correction. One could call this "apparent zone time", meaning apparent local time for 15 or 30 degrees east longitude. In publications of the Sundial Society, an asterisk is often used, thus: MET\* or MEZT\* (*midden-Europese (zomer-)tijd\**, = CET\* or CEST\*).

The equatorial dial is the simplest, both in principle and in construction. The dial face, in the equator plane, has a short perpendicular pole style and equiangular hour lines. On this object, it is the only dial showing local apparent time.

Armillary spheres are often called equatorial as well. Admittedly, they have an hour band in the equator plane, but the author finds the relation remote. He does see a strong

kinship between horizontal, vertical, equatorial and in general arbitrarily declining and inclining dials, all having hour lines converging in the pole style foot point. Likewise, he finds vertical west and east dials and polar, ring and cylinder dials related, because of their hour lines all parallel to each other and to the pole style.

The vertical south and the horizontal dial share a single pole style. The picture would have been even more convincing had the hour lines of both been extended to the intersection of the sundial faces. Both dials show MET\*, and an instruction reads **-E = MET**. With an implied **readout** in front, this means: the dial readout, minus the equation of time from the graph, is central European time.

A name for a vertical and horizontal dial with a common style is *diptych*. Portable foldable diptychs, with a string style, were common.

The polar dial and the east and west vertical dials are related. Their hour line patterns are identical, except for a difference of six hours. The numerals differ 7 and 5 hours however, because the polar dial reads OET\* (*oost-Europese tijd\**, = EET\*) which is really the same as MEZT\* (CEST\*).

A north vertical dial is not so common, but it does work during the summer half of the year. Here, hour lines run from 6 to 9 and from 19 to 21 hours CEST\*. A north and south vertical dial would share a common pole style if on the two sides of the same plane.

The EOT graph is over the south dial. The definition used here is that EOT is local apparent time minus local mean time. The International Astronomical Union and the Nautical Almanac use this definition. Many well-known authors use the opposite definition, however.

Finally, in "other polyhedrons", Maes mentions sundials on five faces of a cube, and 25 sundials on a 26-face polyhedron, possibly Alsation, in a Horn private garden. A concave polyhedron example is the Menkema estate dial of 1722, which totals 34 dials.

An Introduction to Gnomonics, part 4

F.J. de Vries

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In this instalment, Fer introduces the cardinal-directions cube sundial with its north, east, south and west *direct* dials and the horizontal dial on top. He shows how to construct the dials, and why the north dial only works in the early morning and the late evening in spring and summer.

The vertical *declining* sundial and its construction are subject of the next paragraph. By definition, and for the whole globe, the declination of a south-facing wall is zero; the sign is reckoned positive for west, negative for east declinations.

Logically, the following degree of freedom is *inclination*. In constructing an arbitrarily inclining *and* declining sundial we find a remarkable parallel between latitude, declination and inclination on the one hand, and the construction details style height, angle between substyle and line of steepest descent, and substyle hour angle, on the other. Some equations follow, as well as a practical example. - A special dial is one with a dial face parallel to the pole style, directed north or south; this is a polar dial. As the style height is zero, the hour lines are parallel. Actually, the direct east and west dials answer to the same description.

Fer introduces a consistent notation for sundial plane orientation. The normal to the sundial plane intersects the celestial sphere in point P. Specification of P in terms of azimuth and height will fix the sundial plane.

Azimuth is counted from south, positive towards west, and this will be the declination of the sundial. A horizontal sundial has an indefinite [not infinite] declination; we will use  $d=0$  in that case.

There are three possible choices for the other co-ordinate: height, zenith distance or nadir distance; all three have been used in gnomonics. Fer chooses zenith distance. The zenith distance is the same as the angle from the horizontal to the back of the sundial face.

To be sure, different systems are possible; the principle point being to stay consistent. Some examples using the definitions covered are: horizontal dial,  $i=0$   $d=0$ ; vertical direct south,  $i=90$   $d=0$ ; vertical direct north,  $i=90$   $d=180$ ; equatorial dial, south side,  $i=90+f$   $d=0$ ; polar dial, southern hemisphere, south side,  $i=180-|f|$   $d=0$  (check this!).

Henric Bierum's cleverness E.L.H. Roebroek 29  
 The title page of the oldest known Groningen book on sundials (by Bierum, 1676) shows two men sawing sundial patterns off a parallelepiped. The top face is equatorial and has the usual equiangular hour line pattern on it; the long sides are parallel to the axis of the earth. If we think of the hour lines as the intersection of the corresponding hour planes with the top face, than every other cut off the block will also be a correct sundial face. Several photographs show a modern Bierum-block and some ways to cut it. One picture is titled "Bierum's block = the core cut out of the celestial apple". Because the Bierum block method appeals to craftsmanship, it supports Hans de Rijk's motto of *Sundials everywhere*.

Clavius' Sundial ruler F.J. de Vries 34  
 To introduce the concept, Fer first refers to the more common Foster sundial ruler. It has a scale for latitude and one for the hours. In use, one draws the 6-18 hours line and the 12 hours line perpendicularly on it, measures off the latitude from the 12 hour line, and finally uses the hours scale of the ruler to mark off the other hour lines. The Clavius ruler works differently. The first line in this case is the equinox. The ruler then gives distance to centre of the hour lines. Finally, the hour lines are drawn from this centre to the points marked off on the equinox, using the other scale on the ruler. In fact, there are two, one for horizontal and one for vertical dials, although this would not have been strictly necessary. Because Clavius' ruler uses the hour points on the equinox and the pattern centre, one can also construct a style triangle and the (imaginary) gnomon footpoint with it. This in turn allows the construction of the horizon on a south dial. Having done that, a declining sundial may be constructed. To this end, an auxiliary line, intersecting the equinox under an angle equal to the declination, is drawn and a horizontal dial constructed on that. The intersection of its hour lines with the equinox will be the hour points for the decliner. The construction, the equations describing the Foster and Clavius rulers and the proof are in the remainder of the article.

Literature, 1471 .. 1488 J. de Graeve; D.L.J.M. Verschuuren 39  
 The author had noticed that in B03.2, the numbering of the entries is not always correct - the numbers keep skipping back to 1459. And even the pages of B03.2 themselves are incorrectly marked 03.1 [now this was my fault, I just put the wrong number on - RH]. Guest author Jan de Graeve reviews three books. *The sun in the church* by J. Heilbron, on noon lines in cathedrals and the Easter date; *Spheres: the art of the celestial mechanic* by J. Kügel, a very well made catalogue of beautiful instruments on a commercial show in 2002; and *Elisabethan instruments makers* by Gerard L.E. Turner, a study on 16th century English scientific instruments. - A fourth entry by De Graeve is "The oldest equatorial sundial?" and a description of a drawing from "Montre de Sapience". The drawing shows a horizontal sundial, an equatorial sundial, a sheperd's dial, and an early quadrant. This document proves that the sundial art was already advanced and valued in the early fifteenth century. Zonnetijdingen - 1476.2 *The Snellegem riddle solved*. E. Daled, M. Jooris, O. Lisein. It was quite a normal dial after all, but someone, somewhere, some time ago had fixed the style plate the wrong way round. Analema - 1477.5 The village of *Porrera*, on the Spanish wine route, has 598 inhabitants and 14 sundials. 1477.10 *A proposed gnomonic nomenclature*. A. Angulo. Up to now, standardization has not caught on very well. An invitation for discussion. Gnomonica Italiana - 1478.9 *The shadow sharpener*. G. Ferrari. Esaltore d'ombra, complete with equations, estimated accuracy possible, and error discussion. Zenit - 1488.1 *Dutch Sundial Society celebrates twenty-fifth anniversary*. Hans de Rijk. "Sundials serve no practical use whatsoever". Yet, there are 18 sundial societies in several countries.

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