



the staff in two different ways, and because of the two different sights. The subranges are  $1^\circ - 1^\circ55'$ ,  $6^\circ15' - 13^\circ$ ,  $1^\circ55' - 7^\circ30'$  and  $12^\circ15' - 40^\circ$ .

The *Universal Ring Dial* is classic, and this kit is beautifully done. The guide is excellent, but it is still advisable to read ahead one or a few points to see what lies ahead, and to test moving parts before applying glue.

The ring dial has a declination scale as well as a date scale. It is truly universal, in that it works in both northern and southern latitudes – something not often seen in sundials.

For more information, find Icapacity on [www.ipacity.nl](http://www.ipacity.nl)

14 The Met Office's sundial M. Hugenholtz

The Royal Dutch Meteorological Office publish suntrack graphs for 51, 52 and 53 degrees latitude. The author describes a sundial construction that uses the numbers from these graphs. Referring to Fig. 1,  $\beta$  is the latitude. Let  $OPP'$  be a style triangle rotated about  $OP$  into the horizontal plane left of the N-S line, and  $UPP''$  the edges of a vertical surface  $A$ , also rotated into the horizontal plane. The azimuth  $AZ$ , from the graph determines line  $S$ .  $P'P'' = PP'$ . Line  $H$  is determined by the altitude  $h$ , also from the graph. The intersection of  $H$  and  $S$ ,  $U$ , is a point of the hour line  $OU$  for that time.

An advantage is that date or declination lines are easily found as well as the hour lines: connecting all the  $U$ 's gives the declination line for the declination chosen for the construction. – Fig. 2 shows the construction for a declining vertical dial.

17 Locating the sun in the sky H.W. van der Wyck

The author establishes a reference system and then introduces the various variables dealt with. Next, using spherical trigonometry, he derives equations to calculate local co-ordinates for the sun from latitude, longitude, date and time.

18 Sundial Park Genk #5: The Euro-meridian F.W. Maes

22 Introduction to Gnomonics, part 2 F.J. de Vries

Co-ordinate systems, terrestrial navigation and celestial navigation are in this part. Some stress is placed on the need for rigorous conventions as regards signs, reference points and so on. From the local horizon system, we progress through declination and hour angle, declination and right ascension, and finally ecliptic latitude and longitude are treated.

27 1564 polyhedron - continued F.J. de Vries

28 Zaltbommel book dial F.W. Maes

When in Zaltbommel, the author went to see the book dial. This is in the collection of the museum in the beautiful house built in 1535 for Maarten of Rossum, field marshal for Charles duke of Gelre. Unfortunately, the dial was in storage, but manager Bulthuis was very kind and fetched it. Mr. Maes had ample opportunity to measure and draw the book dial, and a description follows, together with his thoughts about classifications of sundials, and a mention of the modern catalogue database used by five museums in Gelderland (the then Gelre).

32 Shifted Italian hours F.J. de Vries

A noon line in San Giuseppe Cathedral in Brescia, Italy, gives the time for the summer solstice transit as  $XV^{45}$  for Hora Meridiei. Remember, these are Italian hours, which start at sunset. However, there was a system of "shifted" Italian hours, for civil use, which started at 30 minutes past sunset.

Testing the Brescia solstitial Hora Meridiei using "ordinary" Italian hours, we would have to conclude from the formula  $\cos T = -\tan \varphi \tan \delta$  and  $T = XXIV - XV^{45} = 8h15m$  ( $123.75^\circ$ ), that  $\varphi$  for Brescia is  $52^\circ$ . Of course it is not; actually it is  $45.5^\circ$ .

Working the other way around, we find that  $T = 116.18^\circ$  or  $7h45m$ , which is 30 minutes different from what we found earlier. We may therefore conclude that the Hora Meridiei was  $XV^{45}$  in *shifted* hours.

33 "De Zonnewijzerkring", text and music by: H.W. van der Wyck

A two verse ditty extolling the virtues of the Society and the objects of its affection. Tempo di marcia.

34 Index of names of Dutchmen related to sundials H.W. van der Wyck

Two-page list of names and sources where mentioned. Of considerable value for historical research.

36 *De Zonnewijzerkring: fifth Lustrum* F.J. de Vries  
 Marinus Hagen founded the Sundial Society in 1978. This year we celebrate our 25th anniversary, a lustrum of lustra. Fer recalls the lustra we had. – 1983: three exhibitions in Utrecht, and the presentation of “The Sun as Clock”, written by Hans de Rijk. The newspaper Zwolsche Algemeene paid for the restoration of the sundial on St.Nicholas. Moreover, the Society presented the City of Utrecht with a plan for an analemmatic sundial on St.Johns Cemetery Square. It was built shortly after. – 1988: an exhibition in the Maritime Museum in Amsterdam. “25 Centuries of Timekeeping” (by Hans de Rijk). Chriet Titulaer delivered the lustrum speech and dedicated the Hans’ book to Marinus Hagen. – 1993: Also the year of the fiftieth Bulletin. This medium binds us all together, and meanwhile we see its concept copied by societies worldwide. And to think we started it! Govert Schilling held a talk on Stonehenge. All members received an “under water” (actually Perspex) sundial. The refractive index of the Perspex distorts the hour lines into a pleasing pattern. – 1998: An entirely different setting: a photo contest. The photos were displayed in Den Dolder, where Prof. Baudet speeched. The widow Hagen received the book “Sun and Time”, a compilation of the most important of her late husband’s papers. De Rijk, Taudin Chabot and De Vries edited this book. Again, all members received a small sundial based on a penny. Member Fer Wilbrink made these dials completely *gratis*. – 2003, the fifth lustrum: the celebration is on 28 June 2003.

38 Solution to the Bulletin 02.2 puzzle (continued) F.J. de Vries

42 The Yabashi point and its applications in sundials A. van der Hoeven  
 A Yabashi-circle is a circle drawn in such a way that its perimeter is cut in equal parts by the hour lines of a horizontal or vertical sundial. This is not possible exactly, but a distance  $\epsilon$  and “starting angle”  $\alpha_0$  for the 12 o’clock line exist for which the errors are minimal. The author finds an error of around four minutes. He uses two gnomons, each for half the solar day. – One of the advantages of equiangularly spaced hour points is the ease with which longitude and eot corrections are performed.

A special interest of the author is the auto-aligning sundial, for which the direction of the local meridian does not need to be known. He combines the Yabashi dial with a Foster-Lambert dial, which is a derivative of the analemmatic. An F-L dial has a circular equiangular scale, and therefore it was possible for the Yabashi and the F-L dial to share the same scale.

However, in the Yabashi dial, the noon line is not a diameter of the circle, and so Foster-Lambert dial had to be set forward by a certain constant amount of time. The author has solved this with a cylindrical gnomon, reading the edge of the shadow. The two Yabashi gnomons flank the cylinder. In the afternoon, the other Yabashi gnomon and the other side of the cylinder are used.

When does one of the dials eclipse the other? A moment’s reasoning showed this to be at sunset and sunrise, and hence not much of a problem.

To eliminate the need for the moving F-L gnomon, one might use a set of scales on a cylinder, slanted by  $\phi$  and with a circular intersection with the horizontal.

46 “Bornfelt” sundials H.W. van der Wyck  
 Pewter sundials cast from a slate mould signed Bornfelt are for sale in the Dutch Timepiece Museum for € 40,- (with certificate). – The catalogue to the large TIME exhibition of 1990 lists two Bornfelt dials, but erroneously reports them as signed “Born fecit”. In fact, it says Bornfelt here as well.

47 Literature 1446 - 1458 D.L.J.M. Verschuuren