

A VERY PERSONAL SUNDIAL

ORTWIN FEUSTEL

This is the short story of the development of the sundial shown in Fig. 1, which was occasioned by the death of my wife.

Prologue

Death, as the most elementary experience in human life, raises many questions but ultimately compels us to accept the unavoidable. A sundial with additional personal date lines provides a memorial that is special for me: the symbolic traces of gnomonic shadows impress us about the transience of our existence.

Conception

Characteristics of the gravestone

The polished gravestone is of nearly-black Impala granite (from South Africa) and measures 800 × 550 × 40 mm. The typeface for the chiselled name is Times New Roman with a type size of 35 mm. The name is light-coloured (silvery) and positioned on the lower area of the stone. The stone's upper part is reserved for the mounting of the sundial (about 400 × 400 mm); there are three dead holes with a depth of 30 mm for cementing threaded rods (6 mm in diameter).

Declination of the gravestone

The normal line of the gravestone's front points more or less southwest. Finding out the exact direction a self-made shadow angle measuring instrument was used as shown in Fig. 2. This equipment is very helpful for calculating the required dial-plate declination based on the angle which the pin gnomon's shadow makes with the vertical through its base at a certain time.



Fig. 2. Equipment measuring the orientation of the gravestone.



Fig. 1. The completed dial on my wife's gravestone.

Guidelines for the sundial

Hardware: The dial plate, pin gnomon and three spheres (15 mm diameter) for fastening consist of matt sandpapered stainless steel; delineation and lettering are laser cut, so that the dark shade of the gravestone shows it off to its advantage; three mounting holes with a diameter of 7 mm make it possible to adjust the dial; a gold-coated sphere (representing the sun) at the gnomon's tip serves as a nodus.

Delineation: The declination lines for the solstices and equinoxes are marked with their zodiacal signs; two additional declination lines indicate the days of birth and passing, each marked with its date and a symbol; the number and lettering of the hour lines (apparent local time) are in accordance with the alignment of the gravestone.

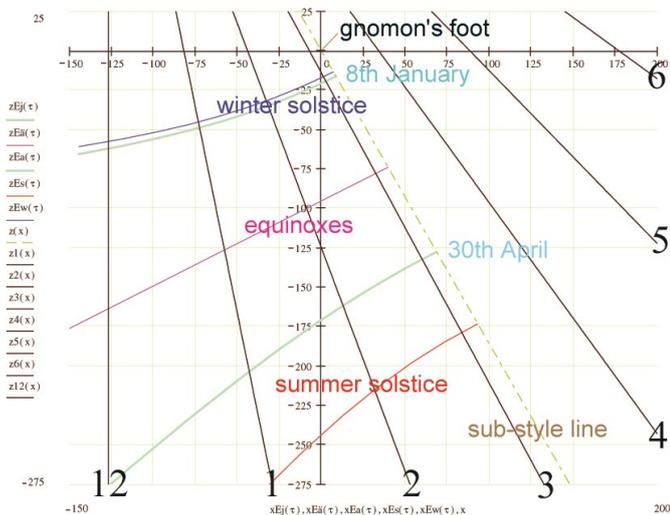


Fig. 3. Diagram of the dial's delineation; the parts of the declination lines not shown run symmetrically to the sub-style line.

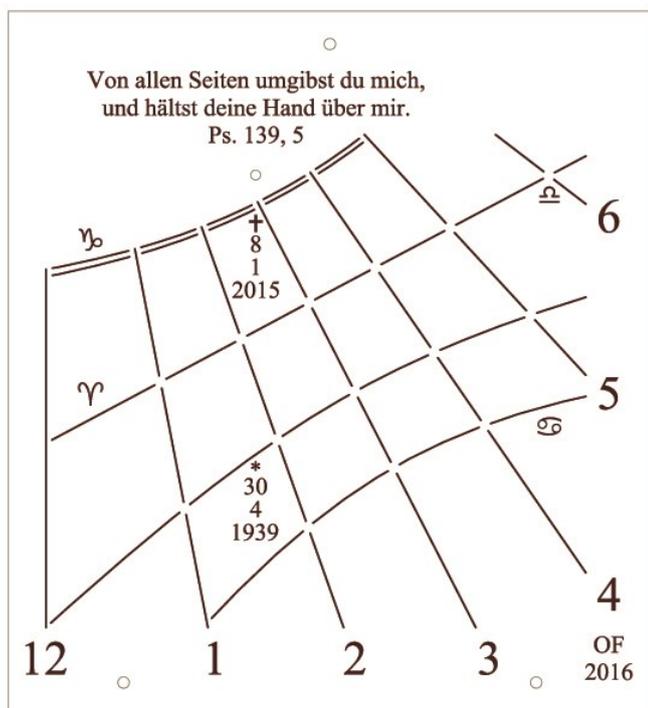


Fig. 4. Drawing of the dial plate as documentation for the production; the plate measures 430 × 390 mm.

Inscription: An appropriate quotation is placed above the pin gnomon.

Overall: All the lines (width of lines) and lettering (type sizes of Times New Roman) produce a harmonious appearance.

Draft

Measurement of the shadow angle

Fig. 2 explains the method of measurement: the radio clock documents date and time of day correlating with the current shadow angle. Ten measurements of the shadow angle on three days at different times yielded for the declination of

both the gravestone and the dial plate a calculated^{1,2,3} mean value of 40.25°.

Calculation of the dial's delineation

The arrangement (position, spreading) of the declination and hour lines on the dial face essentially determines its appearance. It was therefore necessary to find out the appropriate length of the pin gnomon. Fig. 3 shows the resultant diagram for the delineation; the solution by trial and error⁴ amounted to 150 mm for the height of the nodus (centre of the sphere) above the dial plate. The gnomon's sphere has a diameter of 15 mm.^{5,6}

Drawing of the dial plate

The drawing in Fig. 4 comes from a handful of dial-plate designs – based on the delineation in Fig. 3 – in which gnomon positions (origin of the delineation's coordinate system), lengths of declination and hour lines as well as type sizes and placement of the lettering were varied. The declination and hour lines are interrupted each at their crossings on account of the laser cutting. The centre of the quotation, gnomon's foot, symbol and date of the day of passing and symbol and date of the day of birth are arranged meaningfully along one line.

Manufacture

At the laser-cutting stage the laser beam cuts out all the material within a closed line (poly line). That means that the wide declination and hour lines as well as the characters in the drawing of Fig. 4 are needed simply in their contour lines. Furthermore, characters with inner and outer boundary lines have to complete in such a way that parts of the object cannot get lost (see Fig. 5). Fig. 6 shows the appropriate modified drawing of the dial face.

The serifs of Times New Roman with type sizes of 10 mm and 20 mm have very small radii within their poly lines so the dial plate was laser cut from sheet stainless steel only

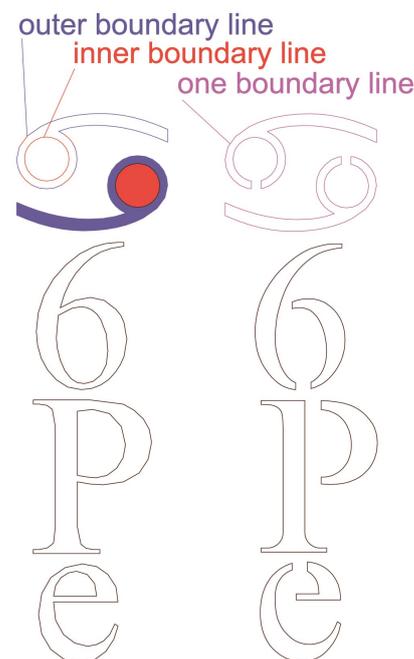


Fig. 5. Examples of characters modified for laser cutting.

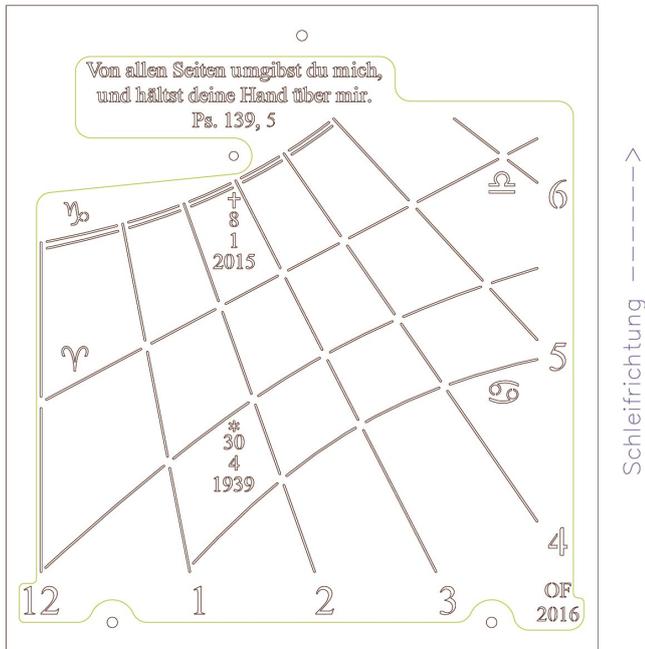


Fig. 6. Technical information for the production; the green line represents the frame on the rear face, the blue arrow indicates the direction for sanding the front face (see Fig. 7).

1 mm thick. Therefore, a ‘frame’ of 2 mm thickness – joined to the sheet – ensures the necessary solidity of the plate and the fastening of the pin gnomon (see Fig. 8).

Epilogue

About twelve hours before my wife drew her last breath some verses from Psalm 139 were of some consolation to her, especially verse 5: *Von allen Seiten umgibst du mich, und hältst deine Hand über mir*⁷ (You are all round me on every side, and you protect me with your power).⁸

Also the sun is all round us with its power!

Fig. 9 shows a close-up of these words from Psalm 139 as they appear on the dial.

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Fig. 7. Sanding the dial’s front face. Photo: Carlo Heller.



Fig. 8. Detail of the rear of the dial.



Fig. 9. Close-up of the gold-coated sphere representing the sun with the inscription in the background.

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