

Entry for the Horizontal Layout Feature of The Compendium

My suggestion (and my favourite) procedure for graphically setting out an horizontal dial is one that was published by William Leybourn in *The Art of Dialling*. First published by him in 1669 the method combines simplicity with accuracy. I can do no better than to transcribe his actual text (though with removal of the many instances of the long 's') and his one diagram. I have tried here to include all other aspects of his text from his capitalisations to his punctuation.

The version given here comes from the third edition of *The Art of Dialling* which is dated 1700; I am sadly unable to afford a first edition from which to copy!

Why should this layout approach qualify for inclusion as one of the setting out methods in the forthcoming NASS feature?

Well, first and foremost for the modern reader has to be the confusingly quaint and to me appealing, title that Leybourn gives for the procedure:

How to draw the Hour-lines upon a Vertical (commonly called Horizontal) Plain

Next is the fact that the construction is remarkably compact. Only six constructional steps are needed before the hour lines can be drawn. Compare this with more than 15 steps, the need for a complicated external semicircle during construction and a further need for tracing the end result that applies to the 1790 method of Dom Francois Bedos de Celles as publicised by Waugh in his Dover Book *Sundials – Their theory and Construction*.

All of the construction lies within the dial face so permitting the use of glued paper on the actual brass dial plate and direct marking of the brass as the final step.

Perhaps the only aspect not touched on by Leybourn is how thick gnomons may be accommodated but his procedure is easily adapted to such a need.

I commend this approach as one of the ones to be considered for inclusion in the forthcoming NASS Compendium feature.

Patrick Powers

I - Of the Vertical Dialling

Chap. III

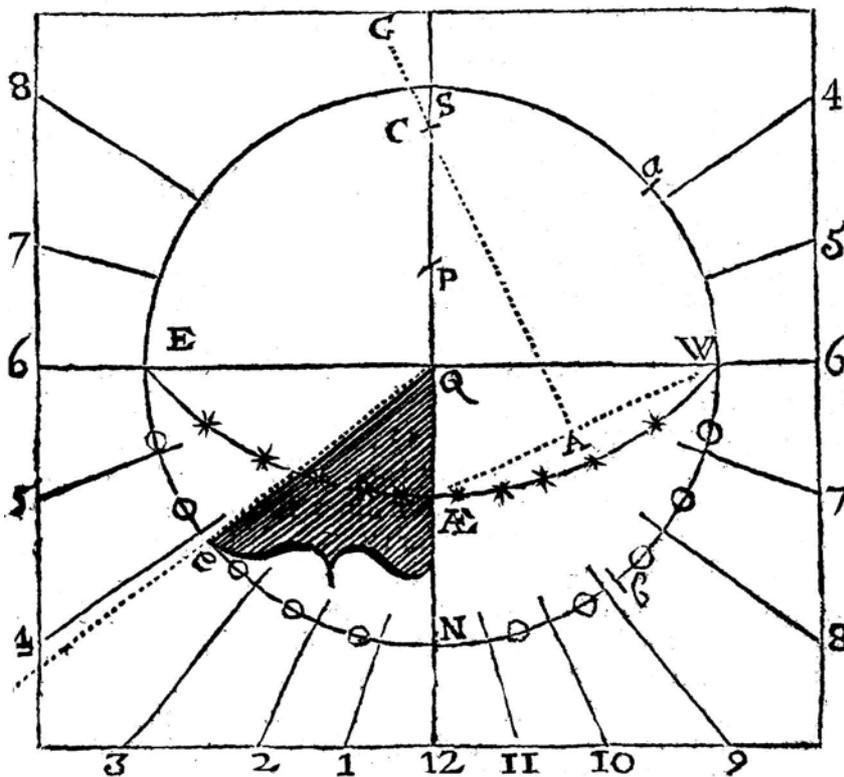
How to draw the Hour-lines upon a Vertical (commonly called Horizontal) Plain

I call this Plain Vertical, because the Pole thereof is in the Zenith or Vertex of the Place, although the Plain itself lie in the Plain of the *Horizontal Circle*. And I not only denominate this, but all the other Plains following, by that part of the Sphere in which the Poles and not the Plains themselves lie. But howsoever the Plain be termed, whether *Vertical* or *Horizontal*, the making of the dial is still the same: And may be made in any known Latitude by the precepts following.

Example, Of a Vertical or Horizontal Plain in the Latitude of London, which is 51 deg. 32 min.

First, Draw a circle E S W N, which Circle let represent your *Vertical Plane*, cross it in the middle thereof at right Angles with the two Diameters, viz. S Q N, for the meridian, and hour-line of 12, and E Q W for the Prime *Vertical* or Hour-line of 6.

Secondly, Because the Latitude of the place is 51 deg. 32 min. take 51 deg. 32 min. out of your Line of Chords, and set that distance from S to a, and from W to b.



Thirdly, Lay a Ruler from E to a, and it will cut the Meridian Line SN, in the point P, which point P is the Pole of the World: And a Ruler laid from E to b, will cut the Meridian in the point $\mathcal{A}E$ so is $\mathcal{A}E$ the point where the $\mathcal{A}E$ quinoctial crosseth the Meridian; and thus have you three points, viz. E, $\mathcal{A}E$, and W, through which you must draw the $\mathcal{A}E$ quinoctial Circle E $\mathcal{A}E$ W, whose centre will always be in the Meridian Line SN. So that you may easily find it, as hath been before taught, and in this manner also. Draw the line $\mathcal{A}E$ W, which divide in two equal parts in the point A, upon which point A, raise the perpendicular A C cutting the Meridian S N, in the point C, which is the centre of the $\mathcal{A}E$ quinoctial Circle E $\mathcal{A}E$ W, upon which point, and the distance C $\mathcal{A}E$, you may describe it.

Fourthly, Divide the Semicircle E N W, into 12 equal parts at the points $\odot \odot \odot$ etc. beginning at the point N and setting six on either side thereof. The Semicircle may easily be divided into 12 parts in this manner; for 60 deg. Of the Line of Chords will divide it into three equal parts, and 30 deg. will divide each of them into two, that is, into 6 equal parts, and 15 deg. is the half thereof, which is a twelfth part of the Semicircle.

Fifthly, Lay a Ruler to Q, the centre of the Plain, and upon every of these points $\odot \odot \odot$, and the Ruler will cut the $\mathcal{A}E$ quinoctial E $\mathcal{A}E$ W, in the points * * *, etc. dividing that into 12 unequal parts.

Sixthly, A Ruler laid to P, the Pole of the World and the several points, etc. upon the $\mathcal{A}E$ quinoctial, will cut the Circle representing the plain in the points | | |, etc. dividing the Semicircle E N W, into 12 other unequal parts.

Lastly, From the point Q, and through the several lines | | |, etc. draw straight Lines, as Q|7, Q|8, Q|9, etc. they shall all be the true Hour-lines for such a *Vertical or Horizontal Plain*. Namely, for twelve of them, that is, from Six in the Morning, till Six at Night.

But for the Hours before, and after Six, that is for 4 and 5 in the Morning, and for 7 and 8 at Night, they are to be drawn by extending the Hour-line of 7 and 8 in the Morning through the centre Q, and drawing them on the other side of the Plain, so shall they be the Hours of 7 and 8 at Night: -Also the Hour-lines of 4 and 5 in the Evening, being drawn through the centre Q, will become the Hour-lines of 4 and 5 in the Morning.

For the Stile of this Dial, take 51 deg. 32 min. the Latitude of your place, out of your Line of Chords, and set them from N to e, upon the Circle of the Plain, so shall a line drawn from Q through e, be the *Axis or Stile of the Dial*, which may be a thin plate of Brass, cut exactly to the quantity of the Angle e Q N. 51 deg. 32 min. and set perpendicularly upon the Line of 12, or the Meridian S Q N, and thus is your dial finished.

If into this, or any of the following Dials, you have a desire to insert the Half Hours and Quarters, you may put them in by the very same means, as you did the whole Hours, but then you must divide the Spaces between every of the points $\odot \odot$ into two equal parts for the Half, and into 4 equal parts for the Quarters of Hours, and proceed with putting on of them in all respects as you did with the whole Hours.