A DUTCH MANUSCRIPT SHOWING POLYHEDRAL DIALS

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One of us (HvdW) owns a rather mysterious Dutch manuscript which includes over 40 large drawings and calculations of sundials. Some of the drawings are for elaborate polyhedral dials which makes it a rare and important document which may shed some light on the origins of these unusual forms.

The manuscript can been dated by the fact that the paper has a French watermark which was used over the period 1670-75 and is relatively common in Holland in this period. This dating is confirmed by a contemporary inscription at the beginning of the manuscript stating that it was sold in a book auction in Nijmegen in 1690, having been the property of a certain Captain Paep (deceased) who was claimed to be the author of the drawings. Whether Paep was a naval or military captain is unknown (though the former is perhaps more likely to be associated with sundials). It can be noted in passing that 'Paep' was a nickname used by Dutch Protestants for Catholics.

The purpose of the manuscript is not clear. The figures are rather well drawn and hence do not look like the working drawings of a sundial maker. Rather, they may be a form of 'commonplace book' made by the owner as he collected information from a number of sources.

There is no overall title to the manuscript. There are three separately-numbered groups of drawings. At the beginning of the second group, of approximately 30 drawings, is a note that they concern cylindrical sundials made by Benjamin Braemers. An example opening is shown in Fig. 1.

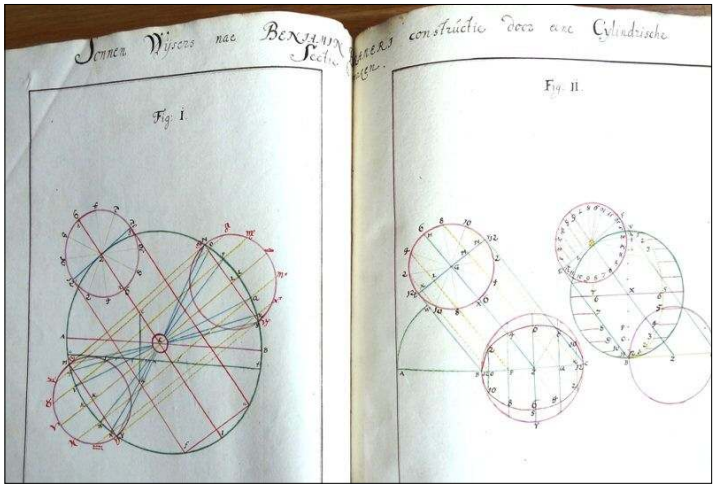


Fig. 1. Drawings of cylindrical sundial construction in the form of Benjamin Braemers.

Braemers (1588-1652) was a German mathematician who published several books and was the inventor of several mathematical instruments particularly for drawing in perspective, and a form of pantograph.[1] The drawings of the manuscript are similar to his published ones but do not appear to be exact copies.

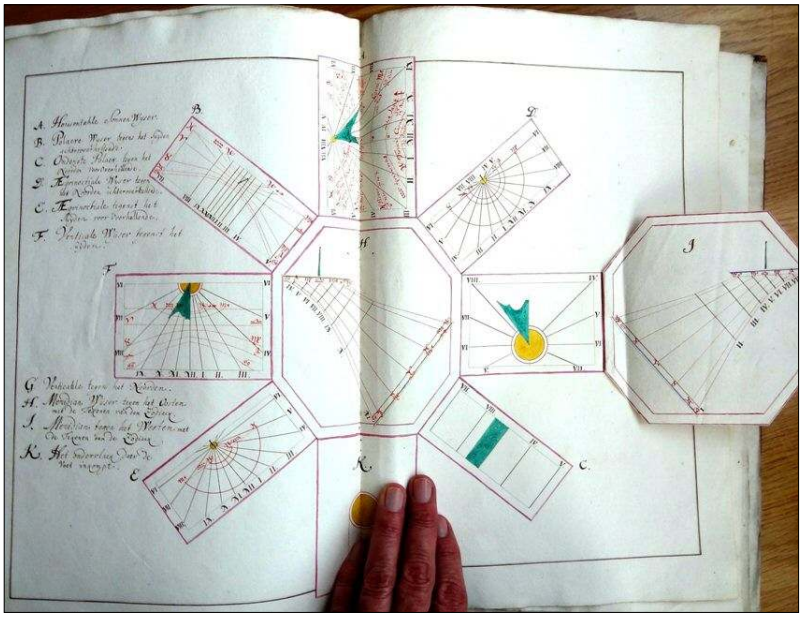
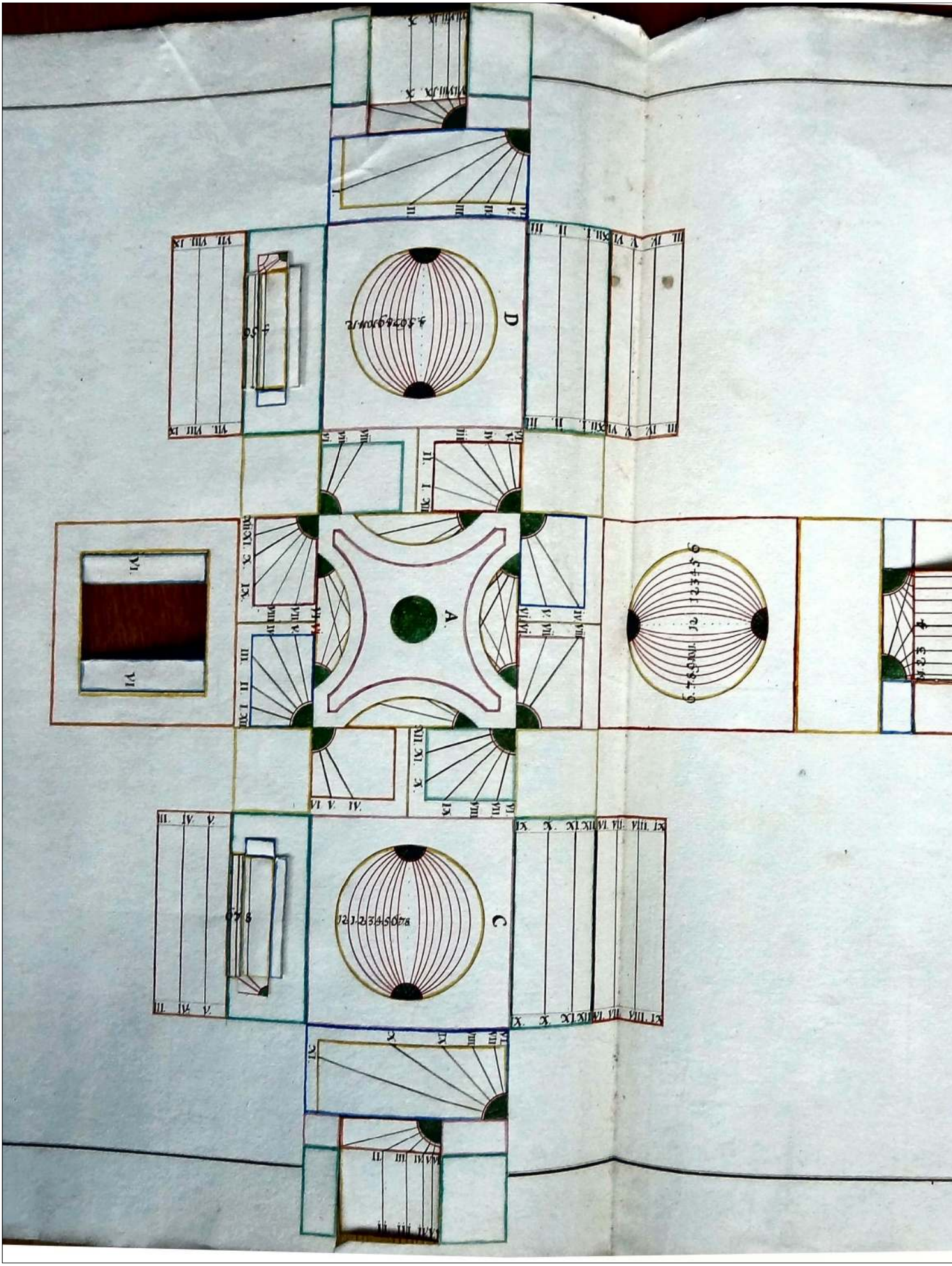


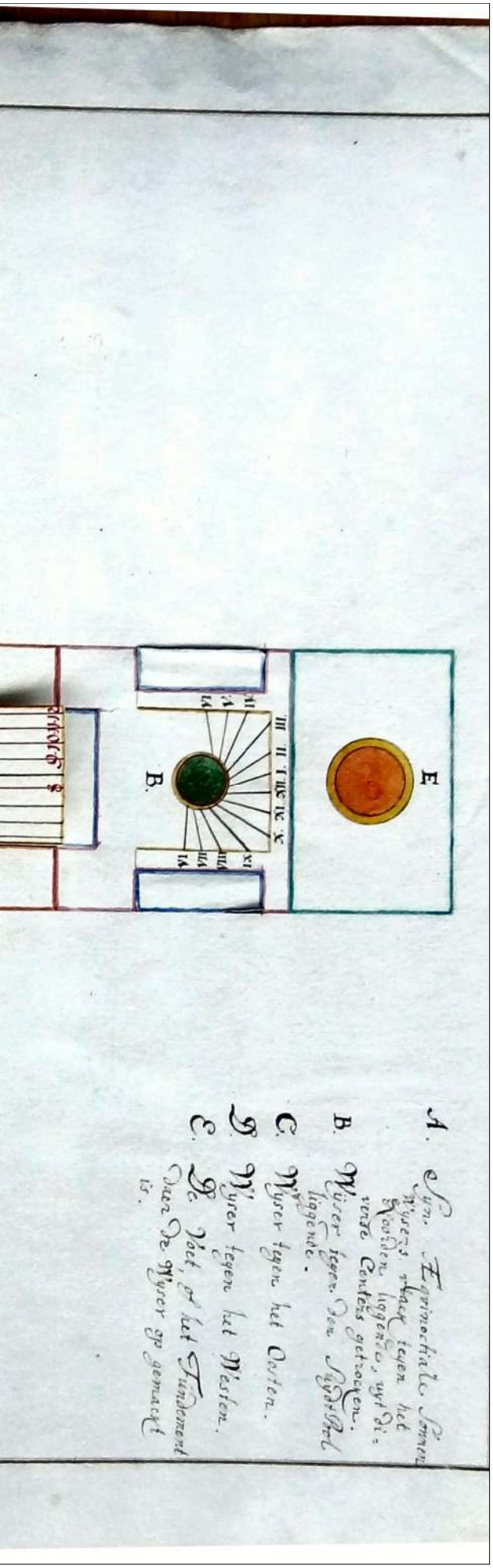
Fig. 2. Simple prismatic polyhedral dial.

An example of a relatively simple polyhedral dial from the third section of the manuscript is shown in Fig. 2. It is clear that if this shape was cut out and folded into a 3D structure it would produce a polyhedral dial of prismatic form with vertical dials for each of the cardinal compass points plus declining dials for NE, NW, SE and SW, together with a horizontal dial on the top surface. The largest, octagonal, faces are for the East and West dials which is perhaps unexpected. The authors have been unable to locate a real structure of this shape.

The real gem of the manuscript is shown in Fig. 3. This drawing for a complex dial consists of scaphe dials as well as planar ones, and also dials with thick rod gnomons. The Dutch key to the faces can be translated as:

A: The equatorial sundials laying just against the north, drawn from different centres.
B: Dial laying towards the south pole.
C: Dial laying towards the East.
D: Dial laying against the West.
E: Is the foot or foundation on which the dial has been placed.


A
C
D



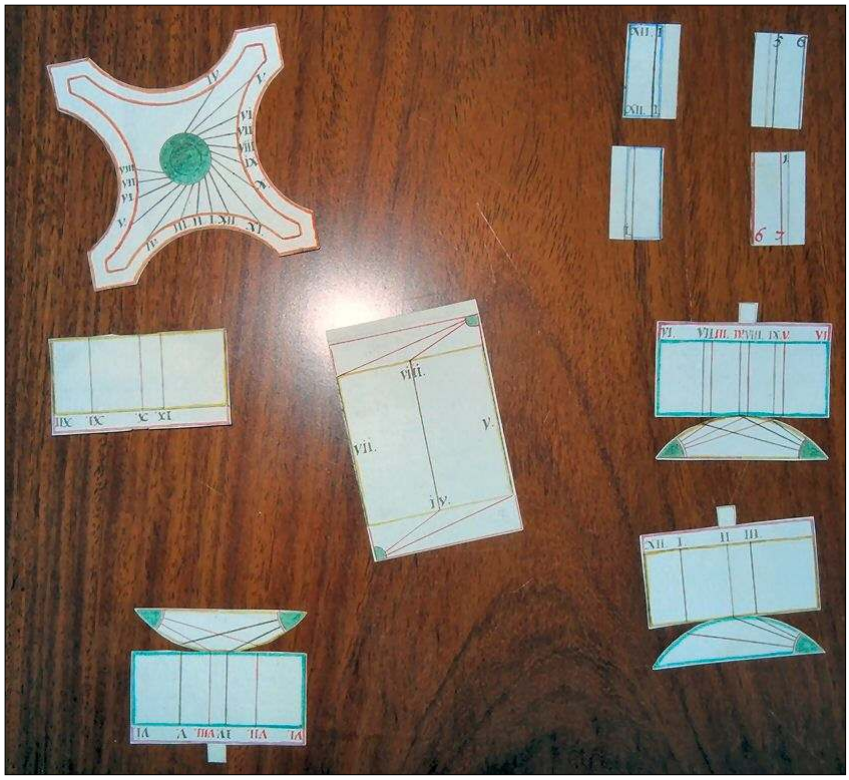


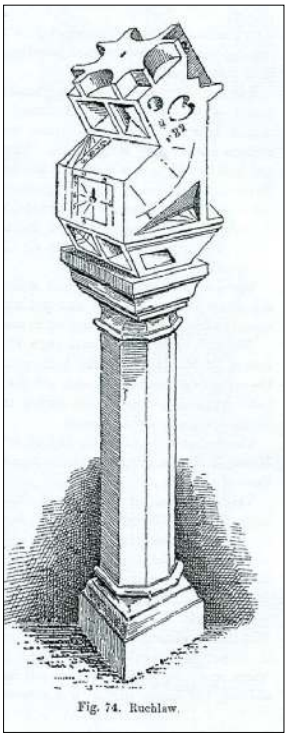
Fig. 4. Cut-out pieces associated with the manuscript.

Fig. 3. Complex 'lectern' polyhedral dial.

This drawing cannot simply be cut out and folded to make a solid structure (we have tried!). Clearly some earlier dialist has also attempted a 3-D construction as a series of separate cut-out pieces, shown in Fig. 4, are associated with the manuscript, though it is not certain that they belong to this particular drawing. It is evident that the cross-shaped structure in the centre is the plan view of a shape which must be projected out of the plane of the drawing and that its edges then form a series of gnomons. Some of the smaller dial faces must be reclining or proclining and not attached directly to the main structure.

Thus, we issue a challenge to our readers to construct a model or isometric drawing(s) of what this dial would look like, accounting for all the faces. Origami experts and modellers, here is your chance to further gnomonic research! The overall form of the dial is expected to be very similar to Scottish 'lectern' dials, a term defined by Andrew Somerville in his catalogue of the dials of Scotland.[2] Of the dials of this type, the ones at Ruchlaw and Woodhouselee are two which seem most similar to the one drawn in the manuscript, particularly in terms of the equatorially-aligned cross structure on the top. Drawings of these taken from the work of Thomas Ross[3] are shown in Figs. 5 & 6 respectively, and form a guide to those taking up the challenge.

When discussing the origins of Scottish polyhedral dials, Somerville speculates about a possible Dutch connection



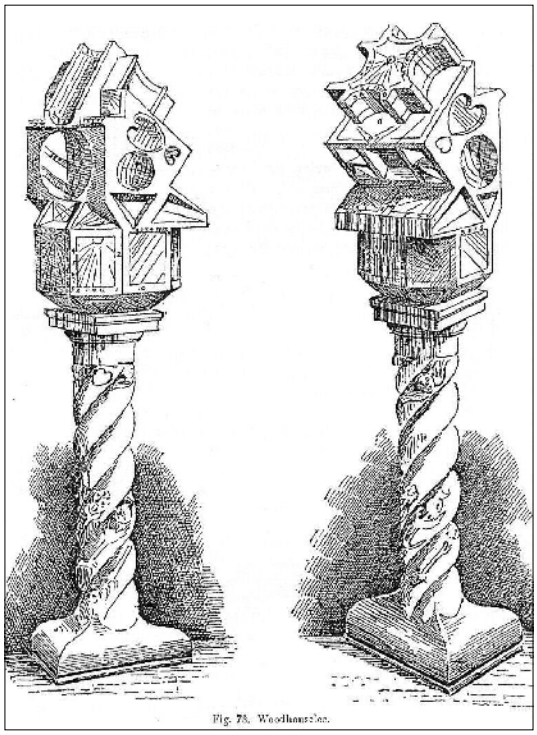


Fig. 5. The Ruchlaw lecturn dial, 1663, now lost. After Ross.[3]
Fig. 6. The Woodhouselee lectern dial, now at the Royal Museum of Scotland. After Ross.[3]

F. Maes

Fig. 7. The lectern dial at the Huis van Loon, Amsterdam, dated 1578.

following the marriage of James VI to Anne of Denmark in 1589 and their exposure to the new Dutch style of architecture.[4] One remarkably early (1578) Dutch polyhedral sundial still exists at the Huis van Loon, Amsterdam – see Fig. 7. Whilst not exactly like the drawing in the manuscript it is much more in the Scottish style than the later polyhedral dials elswhere on the Continent. Does the manuscript provide a missing link?

REFERENCES

1. www-history.mcs.st-andrews.ac.uk/Biographies/Bramer.html
2. A.R. Somerville: *The Ancient Sundials of Scotland*, Rogers Turner, London (1994). This is an extended reprint from *Proc. Soc. Antiq. Scot*., 117, 233-264 (1987).
3. D. MacGibbon and T. Ross: *The Castellated and Domestic Architecture of Scotland,* David Douglas, Edinburgh (1892).
4. Ref. 2, pp. 249-51.

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NEW DIALS

Olympic Sundial

The story of the Olympic sundial was described in a talk at the 2012 BSS Cheltenham Conference. The problems of short timescales, a rather woolly design brief and the efforts to measure the likely shadowing by the surrounding 'shrubbery', which turned out to include at least one silver birch tree, were described, not to mention the necessity of using a solar-defined meridian line rather than the inaccurate one provided by the developer's surveyor.

It is in the silver area of The Great British Garden, close to and to the northwest of the Olympic Stadium. It is 6 m in diameter. The components are polished 5 mm stainless steel (the closest approximation to silver) with etched detailing. The date scale is Welsh slate inset with stainless steel. 'Bailey points' are given as sunset and sunrise