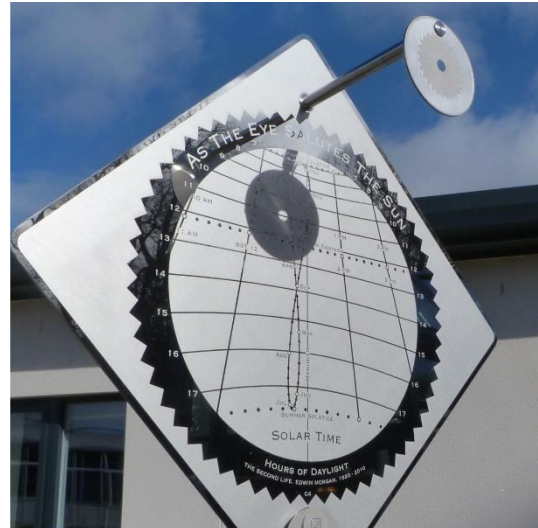


## A SUNDIAL COMMISSION WITH A CIRCULAR ENOCH CALENDAR

*Alastair Hunter*

One or two years ago we had a general enquiry about making a sundial with a calendar marked on it. Of course sundials marked with a calendar in a graphical form like an elongated figure-of-eight are not unusual. Diallists recognise this form as the analemma, and it might have been the answer to the enquiry. In fact our own Solar Time sundial includes the analemma as a feature of its design, so it might have worked well, Fig 1. This article explains how the enquiry progressed and describes the sundial we then designed and made as a private commission.

In 2017 we received more information. The calendar was to have exactly 364 days in the year, like an ancient description found in the writings of Enoch<sup>1</sup>. The arithmetic is appealing, there are exactly fifty-two weeks of seven days, making 364 days. There are exactly four seasons, each season is three months, each month is thirty days long, and there are four specific seasonal days, making a total of 364 days once more. The Enoch calendar begins at the spring equinox and the sequence of twelve numbered months and four season days starts from this point.



*Fig 1. The existing Solar Time design of sundial has the analemma as one of its features, which can be calibrated as a form of calendar.*

The purpose of linking the calendar to a sundial was to show the dates of a whole series of religious events in the year. In other words the sundial was intended to mark the dates of the events directly, in the modern day, without referring to anything else such as a published diary. This would require the gnomon's shadow to pinpoint the passage of the seasons, the months, the weeks, and the individual days of the year. In general terms the idea sounds a striking one but a diallist will have reservations.

To mention a few points: the solar year of just over 365 days is not equal to 364 days so the years will soon drift apart; the spring, summer, autumn, and winter seasons of the solar year, which are separated by the times of equinox and solstice, have unequal lengths so the seasons will not be well aligned; the analemma on a plane dial face is not a linear scale of months, weeks, or days so particular dates will be hard to discriminate. What first sounded like a positive idea now starts to sound less promising, and at this point discussions about the commission were necessary.

The main question was to recognise that a sundial indicating the position of the sun in the sky, and a calendar indexing the days of the year, perform in different ways. The sundial is able to act as a type

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<sup>1</sup> Little is known about the Enoch calendar or the ancient religious group who are said to have used it, although it is not hard to find mention of it online. They may have had procedures for keeping the calendar in step with a real solar cycle, or perhaps this was not very important to them. Its tidy mathematical nature would certainly have made the calendar very convenient for administration and planning. For the present article, the design of a suitable sundial so we could satisfy the commission we were given is the important matter.

of calendar, in a general way, but it does not have a fixed number of days in a year, and its scope for showing calendar detail is restricted. On the other hand a sundial is excellent as a form of visual calendar that gives a real impression of the passage of the year through the seasons. It shows the declination of the sun by the height of the shadow on a vertical dial. Watching the height of this shadow as it follows the course of the seasons is fascinating. These points were accepted and the discussion developed.

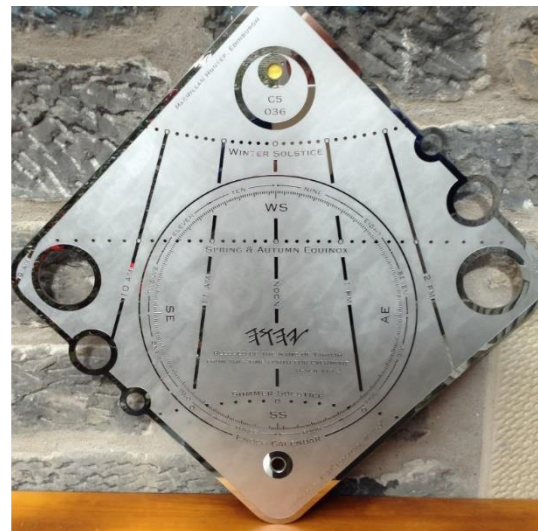
Rather than keeping the original idea of showing the analemma, a new idea of creating a design with the Enoch calendar superimposed on the sundial delineation was introduced. This could be done in a graphical form. The resulting dial would provide information and reference, rather like a look-up table, in addition to the sundial readings. Our own Orbit design of sundial already has a swirling cyclical appearance that could fit in with what was required, Fig 2. This was agreed and work on the new design began.

To take the sundial first, the hour lines were laid out from 9 am to 3 pm, which was the full span for the relevant parameters of latitude, dial proportions, and nodus height and position. The corresponding winter solstice, equinox, and summer solstice lines were well spaced. Next, a detailed graphic representing the Enoch calendar was created. The fifty-two weeks and the twelve months were placed in concentric rings, within a circular border. This was superimposed on the dial in such a way that it did not obscure or interfere with the sundial delineation. Lettering, a text in ancient script, and a biblical inscription, were added, Fig 3.

The sundial and the calendar perform separately, there is no solar interaction between them. The human observer can enjoy their own interaction by watching the shadow and keeping a personal track of the calendar days. All of the 364 days were marked, including the 52 seventh days, but enumeration of the days was omitted to avoid clutter in the design. A close-up of part of the layout is shown in Fig 4.

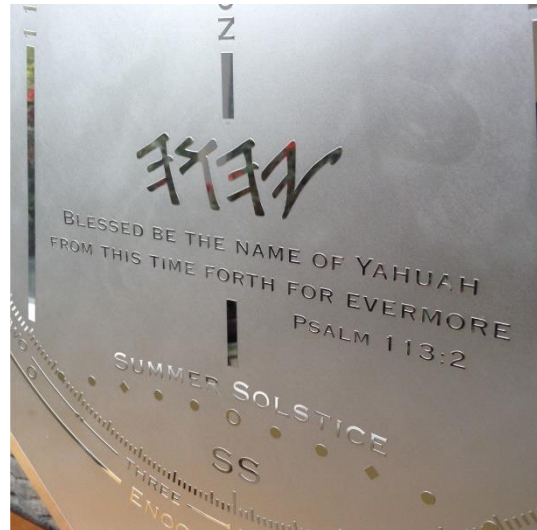


*Fig 2. The existing Orbit design of sundial creates an impression of bodies in orbit with its artistic swirls of rings and circles. The nodus provides the sundial function, while a calendar cycle presented in a circular form could fit in with the design.*



*Fig 3. The new design uses an existing Orbit dial plate. The Enoch calendar graphic is superimposed on the delineation of the vertical sundial.*

*Fig 4. A close-up of the lower part of the finished dial showing the inscriptions, the summer solstice declination line, and a short section of circular Enoch calendar lines. The calendar lines are intended as informative, they do not interact with the solstice line. The day marks are too close for practical enumeration, which has been omitted.*



The finished piece of work in polished and photoetched stainless steel, and patinated brass, is shown in Fig 5. This new sundial commission was installed at its home in the county of Moray in the north of Scotland in July 2017.

*Fig 5. The completed sundial has a span of hour lines from 9 am to 3 pm. The equinox and solstice declination lines are shown by hour, half-hour, and ten minute points. The delineation is exact for latitude 57° 31' N, and the longitude correction disc reads GMT +12 min. The Enoch calendar is a circular graphic graduated by 364 day marks with equal spacing. The circle of twelve months is concentric with the circle of days.*

