A SOLSTICE SUNDIAL

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Earlier this year a group of us went on holiday to South Wales; as the period covered the summer solstice, we decided it should be celebrated in some form. Following the experience of the sundial on Crosby Beach just before the BSS Conference in Liverpool in April 2016,[1] I decided another seaside sundial would be appropriate.

As with that event, planning the dial and exactly where it will be, in advance, is essential. With the aid of maps and Google Earth we located a south-facing sandy beach just a few minutes' walk from where we were staying. The latitude of the bay is 51° 34′ north and we agreed to construct a solar-time horizontal dial using only natural materials found nearby. Before leaving home, I drew out on metre-wide paper the layout of the afternoon hour lines for that latitude; it could be turned over for the morning ones. The mathematics for the gnomon was also calculated to ensure it would be at the correct angle, i.e. the horizontal distance along the north–south line from the root and the vertical height from there to the stick that would be the gnomon.

Fig. 1. Establishing the north–south line and laying out the paper plan.

It being Wales, one is never sure about the weather, so we prepared for different methods of establishing the north–south line. In the hope of a sunny day and being able to draw a line from the shadow of a vertical pole, we calculated how solar noon would relate to watch time. Taking into account the longitude, which was 4° west equalling 16 minutes; equation of time, dial slow by 1 minute 42 seconds and the one hour for British Summer Time gave us a watch time of 13:17:42 – probably a bit over-accurate for our needs. We also planned to have a compass, knowing the correction from magnetic to true north.

On a coastal walk a few days before the solstice, we found the perfect long sticks needed for the gnomon and supports; we were then fully prepared. Solstice morning, we selected a part of the beach just above the high tide line, made it as near level as possible, then established north–south using a compass and an occasional burst of sunshine (Fig. 1).

The gnomon was set into the sand and held in place by a number of heavy stones; after careful measuring, the top end was tied to a vertical stick which we had pushed as far as possible into the ground. We then laid out the paper plan matching the noon and south lines and placed pebbles at the end of the hour lines, left a noon gap and repeated for the morning hours (Fig. 2). The beach has a wonderful collection of coloured pebbles, so we selected black ones for the 6, 3, 9 and 12 o'clock lines and red for the rest; collected the best ones and completed the hour lines (Fig. 3). Larger stones were used as markers at the end of

Fig. 2. Fixing the gnomon and marking the position of the hour lines.

Fig. 3. Completing the hour lines in coloured pebbles.

Fig. 4. Larger stones were used to mark the end of the lines.

Fig. 5. Small pebbles were placed on the end markers to indicate the hour. Photo: Steve Chapman.

each line and on them we placed a number of small pebbles equal to the hour (Figs 4 and 5). In case anyone wondered what it all was, we wrote "SUNDIAL" in pebbles on its south side (Fig. 6).

It was then finished; Fig. 7 shows the sundial from the café on the coastal path above the beach. We had had the beach pretty much to ourselves for most of the day, but come late

Fig. 6. The finished sundial. Photo: Steve Chapman.

Fig. 7. Looking down at the dial from the coast path. Photo: Steve Chapman.

afternoon, it filled up with children on their way home from school and many regulars who swim there daily. By now it was hot and sunny, just as it should be to show off and explain a sundial. People were really interested; we told them how it worked and the difference between solar time and mean time. One man sent a photograph of it to the local television station; I'm not sure whether it made the news.

In 2016, the summer solstice coincided with a full moon, an event which is, apparently, not as frequent as I thought. The last time was in 1967 and will not occur again until 2062. We had hoped to go back to the beach later in the evening to see the dial by the light of the full moon, but in typical Welsh fashion, the weather changed and it was too cloudy.

I don't know how long the dial lasted; it was gone by the next week. I don't mind, it is a busy beach and there was some terrible weather just after the solstice. It was great fun doing it and many visitors learnt something new; it remains in photographs and memories.

REFERENCE

1. J. Jones: 'A sundial in the sand', *BSS Bulletin* 28(iii), 34–35 (September 2016).

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