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The British Sundial Society

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***Front cover**: This new Islamic-inspired sundial is reported on page 21 by Frank King. The dial is designed for a latitude in the Tropics but this photograph was taken in Cambridge, U.K. The dial is arranged so that the shadows are as for a few days after the September equinox when the local solar time is 3 pm. The shadow of the nodus indicates that the Babylonian-hours time is approximately 9h and the Italian-hours time is approximately 21h. It is no coincidence that the average of 9 and 21 is 15; 3 pm can of course be interpreted as 15h. Photo: The Cardozo Kindersley Workshop.*

***Back cover**: Equinoctial dial made around 1790 by Benjamin Martin of London, to the design of G. Wright. It is described by Mike Cowham on pages 14–16.*

Editorial team: John Davis, Frank King, Christine Northeast and David Brown

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EDITORIAL

Let me begin by offering congratulations to Sue Manston who is the only reader to have completed John Lester's challenging crossword puzzle. This featured in the June issue of the *Bulletin* and the solution is published in the present issue on page 33.

We have the usual selection of articles on a wide variety of sundial topics. Some are the result of significant historical research and some relate to dials that members have seen on their travels or that have otherwise attracted their attention. The editorial team is always pleased to receive information about new dials and about interesting sundials that members stumble upon. If you spotted any such dials during the holiday season, we would like to hear about them. It can be surprising how much can be gleaned from a single photograph of a sundial and its surroundings.

On page 6, we publish a sundial poem by Gillian Clarke who recently retired as the National Poet of Wales. In correspondence with us, she wrote "I love sundials, and am pleased to know they have a society of their own!"

Frank King

SUNDIALS BY THE DAVIS DYNASTY

JOHN DAVIS

'John Davis' is a fairly common name in Britain so it is not surprising that there have been a number of mathematical instrument makers with that name. Gloria Clifton's directory[1] of instrument makers over the period 1550 to 1851 lists thirteen John Davises though some of these may be duplicates: there are also numerous other Davises, some of whom may be related. Perhaps the most famous is the illustrious navigator and explorer Captain John Davis (c. 1550–1605), the inventor of the backstaff sometimes known as the Davis quadrant, though the clockmaker John Davis of Windsor (w. 1697–1709) who was apprenticed to Daniel Quare is also well-known. Naturally, I take an interest in any of my namesakes who made sundials!

The company Davis of Derby[2] and its predecessors and successors[3] (it still exists today) can trace its origins to Gabriel Davis (d. 1851) who, together with his two brothers, was a Jewish immigrant from Bavaria (where his grandfather was a rabbi in Pumbersfelton) to Britain.[4] Presumably they originally had an unpronounceable surname and adopted Davis as suiting their new home. The Davis clan set up instrument-making businesses in several provincial centres: for example, David Davis became an optician in Glasgow and a branch in Dublin is also possible. Gabriel settled in the Mount Preston district of Leeds (now Mount Preston Street, on the Leeds University campus), as an optician and maker of surveying and mining equipment, where he eventually became the first leader of the local Jewish community, and it was he who signed the dial seen in Fig. 1. He married Ann Aaron from a Birmingham family and they had six children though most of them died young. His eldest, another David Davis, died in 1842, possibly of cholera, as did his eldest daughter Emma in the same year, with another son Henry having already died in 1830 as a baby. Another daughter, Sophie, survived to marry a Mark Marcus from Dublin but died a year later, in 1848. Only Abigail survived, marrying a James Cohan Pirani (who managed the Leeds branch of the Jewish-owned Leeds outfitters of Samuel Hyam & Co.) later emigrating to Australia where she lived into old age.[5]

With the loss of his sons, Gabriel took on his nephew Edward to work for him and who eventually became his partner and successor to the business when Gabriel died in 1851, being buried in the Gildersome cemetery (which he had himself helped to set up) alongside his son David.[6]

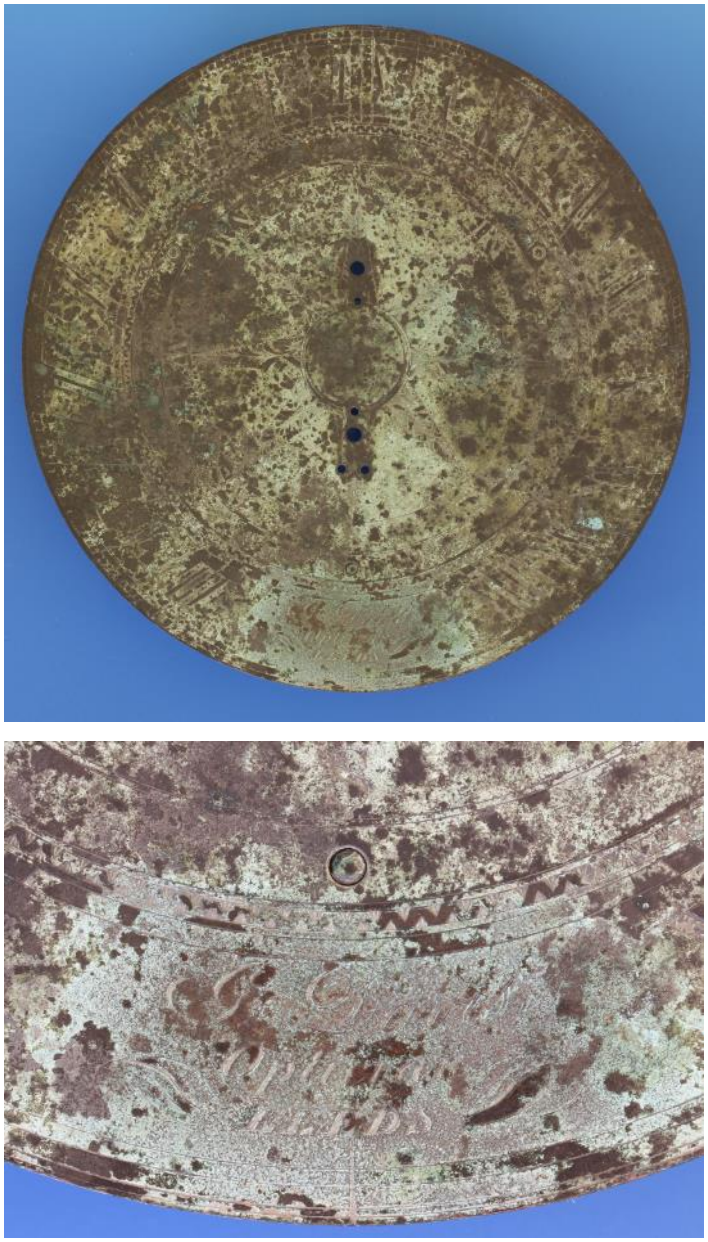

Fig. 1. Top: A horizontal dial plate by Gabriel Davis; bottom: the signature – note also the zig-zag border and the end of the pedestal-fixing screw.

Another of Gabriel Davis's nephews, John (1810–73, Fig. 2) brother of Edward, was born in Thame, Oxfordshire, and was apprenticed to Jacob Abrahams, from another Jewish family.[7] Abrahams styled himself Mathematical Instrument Maker to the Duke of Wellington and the Duke of Gloucester.[8] His main premises were at 7 Bartlett Street in Bath but he also had a shop in Cheltenham, which is where John Davis undertook his

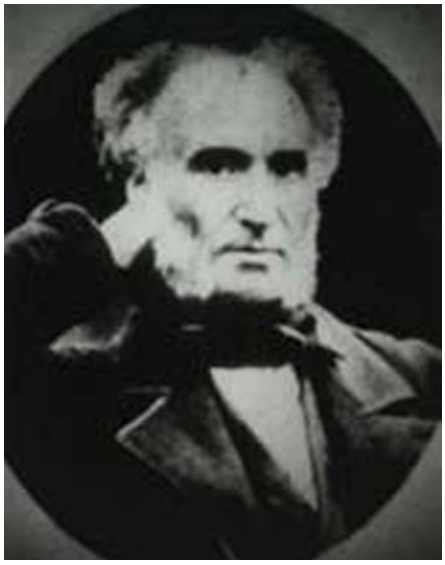

Fig. 2. Portrait of John Davis (1810–73) of Derby. Courtesy D. Johnson, note 3.

Fig. 3. Above: A recent photograph of John Davis's early house, with workshops behind, originally Meynell House and now no. 22 Irongate in the old part of Derby near the cathedral. Below: The space behind the Irongate buildings (22 on the left and 24A on the right) with a view of the cathedral and a jumble of buildings where John Davis had his workshops, probably the ones earlier occupied by John Whitehurst. Photos: Irene Brightmer.

Fig. 4. A painting of 1868 by A.J. Keene, now held by the Derby Art Galley, of the All Saints Works (now demolished) on the corner of Amen Alley and Full Street to which Davis later moved.

apprenticeship. After gaining his freedom in 1830, John went to work for his uncle Gabriel but although based in Leeds he regularly moved around the Midlands taking orders and setting up local shops in places such as Liverpool, Derby and Cheltenham, using the expanding railway services to move around every few months. By 1833 he had set up business on his own account but with a range of instruments very similar to those of Gabriel. By 1843 he decided to settle down in Derby with his wife and their two young sons. He bought the freehold of the 16th-century Meynell town house (Fig. 3) which is now the oldest surviving premises in Iron Gate, Derby, and where there was a workshop at the back to produce his products for the two decades before it was moved to the nearby All Saints Works (Fig. 4). Meynell House had previously been associated with John Whitehurst, a famous clockmaker and instrument maker, who had his workshops there and who has a blue plaque on the next-door building, no. 24.[9] There has previously been some confusion amongst several sources[10] as to exactly which numbers in Irongate Whitehurst and Davis occupied. A commercial directory of 1850 by S. Glover lists Davis as a 'Burgess and Freeholder' of Irongate.

John Davis traded as J. Davis, Derby, and a number of variants before it took on the name of 'Davis Derby' and, later, J Davis & Son. A dial with the Davis Derby signature is shown in Fig. 5.

With the expansion of the coal-mining business, John Davis was able to develop a line of mathematical instruments for the industry, for example anemometers, mining ('Hedley') dials and safety lamps, which quickly became standards, allowing the business to prosper. When he died in 1873, his son Henry was appointed to run the business which continued to expand, moving into new premises in the 1870s at All Saints Works, Amen Alley, Derby. Although the product line at this time included

Fig. 5. A small dial signed "Davis Derby".

items such as turret clocks and weather vanes, it was mining equipment and, increasingly, electrical instrumentation and telemetry which gave the company a strong footing into the 20th century. Although a catalogue from 1877 exists, disappointingly, it does not show any sundials – clearly, they were not a significant item by this time.

Dials by Gabriel and John Davis

The two dials illustrated here are probably less than 50 years apart in manufacture and thus present an interesting comparison. They are quite different in size and also show that technology in the early 19th century was progressing rapidly. Whilst it is possible that the Gabriel Davis dial was actually engraved by Gabriel, it is highly probable that the 'Davis Derby' one was engraved by an employee of John Davis.

The Gabriel Davis dial plate (Fig. 1 – the gnomon is unfortunately lost) is 228 mm in diameter (9″ nominal), around an eighth of an inch thick and is the earlier of the two dials, probably from around 1820. The signature is "*G. Davis Optician* LEEDS". It is nicely engraved and the engraved pattern is absent where it would have been hidden underneath the gnomon, which would probably have had a hemispherical supporter or foot. The two holes which define the origins of delineation are, at about 2 mm diameter, rather larger than average. The gnomon would have been attached by handmade screws rather than tenons. There are four holes: two for the screws and another smaller pair which would have been for tightly-fitting alignment pins.

The engraving features Roman numerals which are outward-facing – standard by this time for London-made dials – delineation to 5-minute intervals with diamond (rather than the earlier fleur-de-lys) half-hour marks, with a narrow zig-zag border inside the chapter ring. The infill on the broad strokes of the numerals has been achieved by perpendicular strokes of the burin and the narrow strokes are elegantly tapered. Generally, a simplification of the engraving from the more florid 18th-century style is evident.

The dial plate still retains a set of three specially-made fixings of a 'mushroom' shape for attaching the dial to a pedestal (Fig. 6). These are screwed into the plate and individually marked with one, two or no punched dots to ensure they go in the matching holes.

The later (c. 1850) dial by John Davis (Fig. 5) is simply signed "Davis Derby" and is just 128 mm (5″ nominal) in diameter. It is unclear whether it was intended for an outdoor pedestal or for a windowsill. The engraving is simple but very sharp and neat. There are two zig-zag borders but the 'feathered' infill of the compass points on the Gabriel Davis dial has been further simplified to a set of parallel lines. The gnomon is attached with a pair of almost modern-looking screws. The numerals remain outward-facing and have their narrow strokes neatly flared into the

Fig. 6. Back of the Gabriel Davis dial, showing the three 'mushroom' fixings with tapered shafts. Inset: the 'one-dot' pedestal fixing. The marks in the patina show that at one time the dial was mounted on a square capital. The shiny spot is the area cleaned for XRF.

Dial Maker	Location	Cu	Zn	Sn	Pb	Fe	As	Others, comments
Gabriel Davis	Back, cleaned	78.9	17.7	1.0	1.8	0.4	0.1	Bi 0.12%
	Back, uncleaned	83.2	14.1	tr	2.4	0.1	nd	
	Front, uncleaned	78.4	4.6	2.7	9.5	2.1	1.1	Bi 0.45%; dark patina
John Davis	Back, cleaned	79.3	18.2	nd	2.4	0.1	nd	
	Back, uncleaned	79.7	17.3	nd	3.0	0.1	nd	
	Front, uncleaned	78.5	17.6	nd	3.2	0.6	nd	
	Gnomon, East	81.5	13.1	1.0	3.8	0.4	0.1	Bi 0.17%
	Gnomon, West	81.5	13.2	1.0	3.5	0.5	0.2	Bi 0.19%

Table 1. Alloy compositions of the components of the two dials (in wt.%, rounded to one place of decimals) as measured by XRF by the author using an Olympus Innov-X Alpha 2000 analyser with a 60-second sampling time and used in its 'Analytical' mode. The instrument was cross-calibrated against a set of CHARM (Cultural Heritage Alloy Reference Materials) test specimens with a representative range of trace elements in a copper-alloy matrix.[13] nd = not detected; tr = trace.

serifs, and the delineation is still to 5-minute intervals, with quarter-hour divisions on an inner ring.

Metallurgy

The metallurgy of the two dials was studied by X-ray fluorescence (XRF) and also by the simple but revealing method of profiling the thickness of the plates across their diameters.

The alloy compositions are shown in Table 1. The Gabriel Davis dial-plate can be seen to be a leaded gunmetal (in modern terms) with a medium level of zinc, Zn, and a quite high level of lead, Pb. The two analyses of the back of the dial (cleaned and uncleaned) show the effect of the thin patination and can be compared to the reading from the front, which has been exposed to weathering and developed a much thicker, mottled patina. The lead concentration differs between the back and the front of the plate in a similar manner to that seen on the much thicker 'Hughes of Bryngola' (1775) dial described in an earlier article.[11] Thus it is fairly certain that the plate is a casting and the lead in the molten alloy has been swept to the last surface to solidify.

The Davis Derby dial plate, in contrast, is a simple leaded brass, with no tin, Sn, detected. Also, the level of the iron, Fe, impurities has been reduced, indicating a more modern smelting process. The general impression is that the material is from a more developed source. The gnomon of this dial, though, has a composition much more similar to the Gabriel Davis plate, even down to the trace amounts of arsenic, As, and bismuth, Bi. There is a good probability that the gnomon came from the same foundry that Gabriel had used.

The thicknesses of the two dial plates were measured at half-centimetre intervals across their diameters, nominally in the N–S and E–W directions, using a mechanical digital thickness gauge with a 0.01 mm resolution. The anvil of the gauge which was in contact with the dial face was fitted with a 2 mm diameter disc of hard plastic, spanning the narrow engraved lines and also protecting the dial face from scratches.

The thickness profiles of the two dials are shown in Fig. 7. The Gabriel Davis dial shows dramatic variations – it is over twice as thick at the rim as in the centre, although this was not readily apparent when handling it. Although the profile is circularly-symmetric, there are no marks to suggest that the disc has been turned on a lathe; rather, it appears that it is the result of the casting process, as is supported by the lead concentration profile. The working front face of the plate is completely flat with the thickness profile resulting from a deep dishing on the back. With this

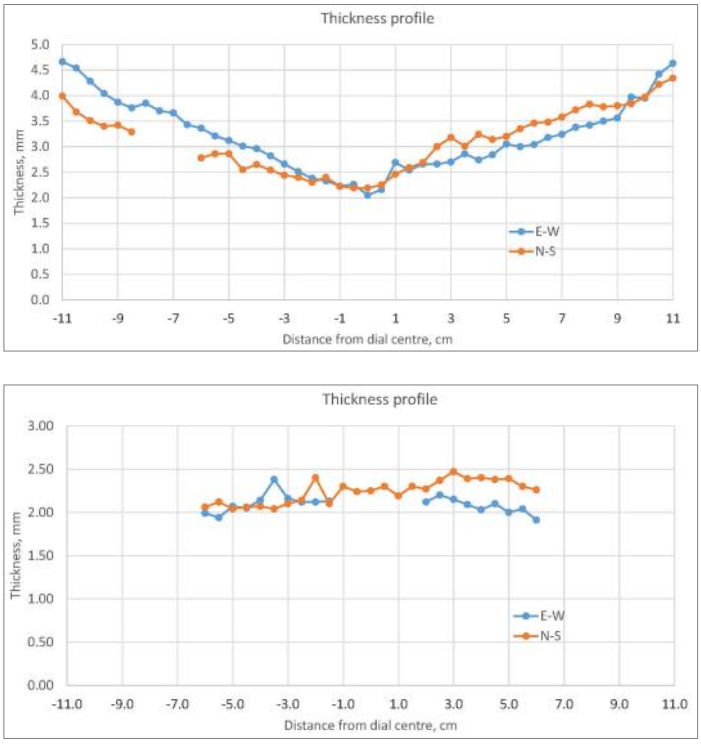

Fig. 7. Thickness profiles of the two dials, measured by a mechanical gauge. The gaps in the profiles are due to interference from the gnomon and from the pedestal fixings. Upper: Gabriel Davis, lower: John Davis.

feature, it is important that the dial is not screwed down tightly to the flat surface of a pedestal or distortion will occur.

The thickness profile of the Davis Derby dial indicates not just that the material is much thinner but also that it is far more uniform. Indeed, other than a slight thinning near the rim – possibly wear – it is nearly as good as modern stock brass and better than would be expected for hammered or 'battery' brass. The likely explanation is that this material has been produced by a rolling mill rather than a battery one. We know that the brass works in the Bath–Bristol region did begin to employ rolling mills in 1840, still powered by watermills,[12] although they were beginning to lose the competition with the brass suppliers of Birmingham who took over as the biggest brass works in the country. At present, the source of materials used by Davis Derby is unknown but it is to be hoped that further studies may reveal this and it may also help to give a more accurate dating of the dial.

ACKOWLEDGEMENTS

I am very grateful to Irene Brightmer for the photographs of modern Derby and for many stimulating communications.

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5. Details and a photograph of Abigail are at *http://artsearch.nga.gov.au/Detail.cfm?IRN=198262*
6. Freedman (note 4).
7. Maxwell Craven: *John Whitehurst: Innovator, scientist, geologist and clockmaker,* Fonthill (2015) records (pp. 205 & 254) that a John Davis, with brothers David and William, attended the preparatory school from June 1798 to June 1799, run by liberal schoolmaster Matthew Spencer in Derby. Although Craven states (p. 205) that this was the founder of the Derby scientific instrument manufacturing firm, the date is too early and this John Davis was actually an uncle of the scientific instrument maker (Craven: personal communication). The school was supported by John Whitehurst I and Erasmus Darwin, members of the Lunar Society, and indicates the tradition of scientific development in Derby.
8. For information on Abrahams, including a whole-body silhouette, see Cecil Roth: 'The rise of provincial Jewry', The Susser Archive, Jewish Communities & Records UK (1950), online at *www.jewishgen.org/jcr-uk/susser/provincialjewry/ bathcamb.htm*. Several copies of his tradecard exist, e.g. at *www.jewishmuseum.org.uk/?unique_name=search-our-collections-new&adlibid=6319*.
9. I. Brightmer: 'Blue Plaques in Derby', *BSS Bull.*, Reader's Letter, 26(ii), 15 (June 2014).
10. Craven (note 7) pp. 28–29 states that John Whitehurst I originally lived in 24 Irongate, next door to Meynell House (no. 22) behind which were his workshops.
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The Sundial

Owain was ill today. In the night
He was delirious, shouting of lions
In the sleepless heat. Today, dry
And pale, he took a paper circle,
Laid it on the grass which held it
With curling fingers. In the still
Centre he pushed the broken bean
Stick, gathering twelve fragments
Of stone, placed them at measured
Distances. Then he crouched, slightly
Trembling with fever, calculating
The mathematics of sunshine.

He looked up, his eyes dark,
Intelligently adult as though
The wave of fever taught silence
And immobility for the first time.
Here, in his enforced rest, he found
Deliberation, and the slow finger
Of light, quieter than night lions,
More worthy of his concentration.
All day he told the time to me.
All day we felt and watched the sun
Caged in its white diurnal heat,
Pointing at us with its black stick.

From *Selected Poems* by Gillian Clarke (Picador, £14.99).

Gillian Clarke (b. 1937) is one of the central figures in contemporary Welsh poetry, the third to take up the post of National Poet of Wales.

A VISIT TO THE 24-HOUR SUNDIAL IN LONGYEARBYEN

DOUGLAS BATEMAN

The extraordinary dial by Tony Moss, at 78° 13′ N, 15° 37′ E, at the 'town' of Longyearbyen in the archipelago of Svalbard, has been mentioned in the *BSS Bulletin* from time to time. This report follows from a cruise with shore excursions to Longyearbyen and some abandoned coal mines.

Fig. 1. The dial on higher ground (tundra) in Longyearbyen. Although hard to see in this photograph, in the middle distance is a row of snowmobiles, the main means of transport in the winter.

The dial (Figs 1 and 2) is unusual in that it cannot possibly show the time in the long winter when the sun never rises, but for the summer when the sun never sets, it requires a full 24 hours of markings. Points to note about the dial are that the hour markings are nearly equally spaced (they would be equally spaced at the north pole), the very steep gnomon, and a 'midnight overlap' (Fig. 3). The overlap of the time scale follows a pattern used by an 18th-century engraver.[1]

The visit took place early in June 2016; we were well wrapped up, given that the temperature was 4° C, with snow still lying in hollows. Fortunately, the sun shone at the appropriate moments. Other members of the Society have visited the dial, including Geoff Parsons and Ian Maddocks; the latter provided me with some useful pre-visit information. I learnt afterwards that there is a visitors' book for the dial in a box on a nearby barrier.

More details of the dial and its original planning can be found on *www.longyearbyen.net/sun*. Other photographs of the dial in winter can be seen in an article by Martins Gills in the June 2015 *Bulletin*, precipitated by the eclipse of the sun on 20 March 2015 and observed in Svalbard.[2]

Fig. 2. The dial in sunshine. Over the years the original colouring has disappeared from the central decoration and black fill in the details.

Fig. 3. Detail of the dial plate showing the midnight overlap and a drawing of the local mountains at the significant date when the sun appears for the first time after the long winter.

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A SUNDIAL SEARCH THAT FOUND A TOPOSCOPE

J. MIKE SHAW

This article is based on a presentation made at the 2016 BSS Liverpool Conference.

It all started with an email that arrived one morning from our esteemed Registrar, John Foad. Attached was a section of the 1909 1:2500 Ordnance Survey map of the Wirral peninsula, situated on the other side of the River Mersey from Liverpool (Fig. 1).

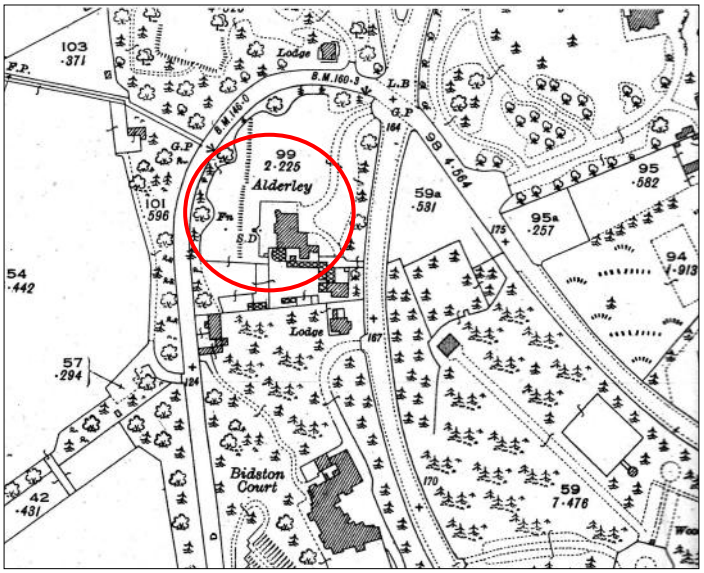

Fig. 1. 1909 Ordnance Survey map.

On the map, John had spotted a small dot with the letters "S.D." next to it in the grounds of a house named Alderley. He wondered if the S.D. indicated "sundial" and, if so, was it still there? I went to have a look.

There is a low hill, the Storeton Ridge, that runs up the east side of the peninsula, and at the northern end there are a number of prestigious houses which command views to the west encompassing the river Dee and the Welsh hills beyond. Alderley was one of these.

Fig. 2. Sundial on pillar.

As is the case these days, the large house had been converted into a number of flats, so I knocked on several doors until I found a resident and got permission to explore the grounds. At the back of the house, in the position indicated on the map, I was delighted to see a sandstone pillar complete with sundial (Fig. 2).

However, my delight soon turned to dismay when I saw that the sundial was a modern, garden centre reproduction. It wasn't screwed into place and could be lifted off, so I did. Underneath was a bronze plate engraved in the form of a toposcope. For the uninitiated, a toposcope is a marker, usually erected on a hill or other high place, which indicates the direction of, and often the distance to, notable landscape features which can be seen from that point. The toposcope had engraved on it the initials WEC, the date MCMXLV (1945) and the maker's mark, CHADBURNS LIVERPOOL together with the company logo (Fig. 3).

Fig. 3. Initials, date and maker's mark.

I had not heard of Chadburns, so I thought I should see what I could find about them. I discovered that the founder, William Henry Chadburn, was both the inventor and manufacturer of the ship's telegraph. There are many images of Chadburns' telegraphs available, most of them showing the same logo, so I was confident that I was investigating the correct company.

Charles Henry Chadburn (Fig. 4) set up business at 71 Lord Street, Liverpool in 1845 as an optician and scientific instrument maker. He must have been successful, as he became optician to HRH Prince Albert! There is a painting of his original shop in the Liverpool museum where there is a section dedicated to the city's instrument makers (Fig. 5).

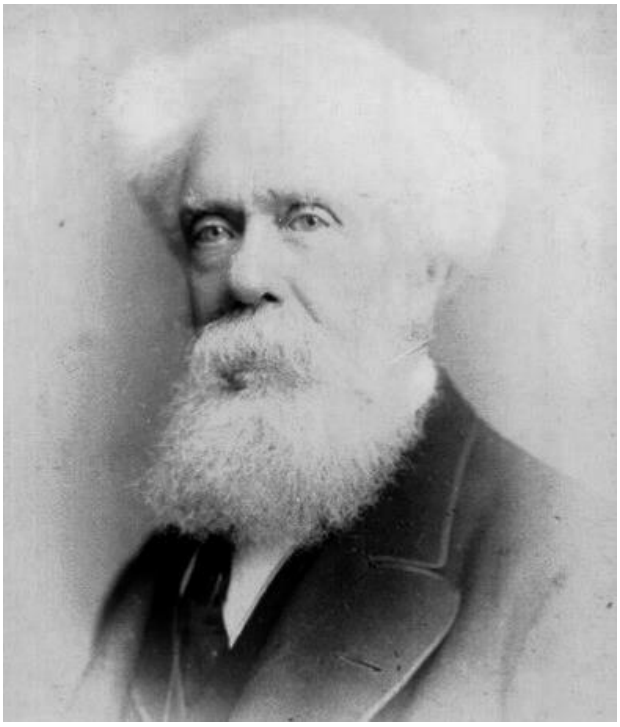

Fig. 4. Charles Henry Chadburn. Photo: Priestly & Son, Egremont, Cheshire.

He made a variety of instruments, including sundials, and Doug Bateman has one of them in his possession (Fig. 6). The photograph shows the dial details enhanced with the use of talcum powder. The bronze dial, diameter 8 inches, made between 1845 and 1861 (the death of Prince Albert) has the equation of time showing local mean time – GMT was not introduced until 1880. He does not appear to have been a prolific dial maker, as there are only two other Chadburn sundials in the BSS Register (SRN 1011 and SRN 7047).

On 1st September 1870 he applied for a patent in the names of C.H. Chadburn and W. Chadburn, his son, then aged 24.[1] He developed the business, which grew into a thriving and large enterprise.

Fig. 5. C.H. Chadburn's shop in Lord Street, Liverpool. From a watercolour by W. Herdman, 1867. Reproduced courtesy of Liverpool Libraries and Information services.

I thought that the initials WEC on the toposcope might refer to a descendant, possibly his grandson William E. Chadburn. A visit to our local library dashed my hopes, as the Birkenhead Street Directory for 1945 showed that the occupier of Alderley at that time was one William E. Corlett, solicitor.[2]

So why, I wondered, did a big engineering company like Chadburns make a one-off toposcope for William E. Corlett? In 1945, Chadburns would not be making single bespoke instruments.

I found a first reference to Corlett in the *Alpine Journal*, which reported his death, at the age of 90, in the 1960 issue, so he would have been 75 when the toposcope was made for him.[3] William Ernest Corlett was a well-known Liverpool solicitor, a partner in Bremner Sons and Corlett of 1 Crosshall Street.[4] He was a philanthropist and there is

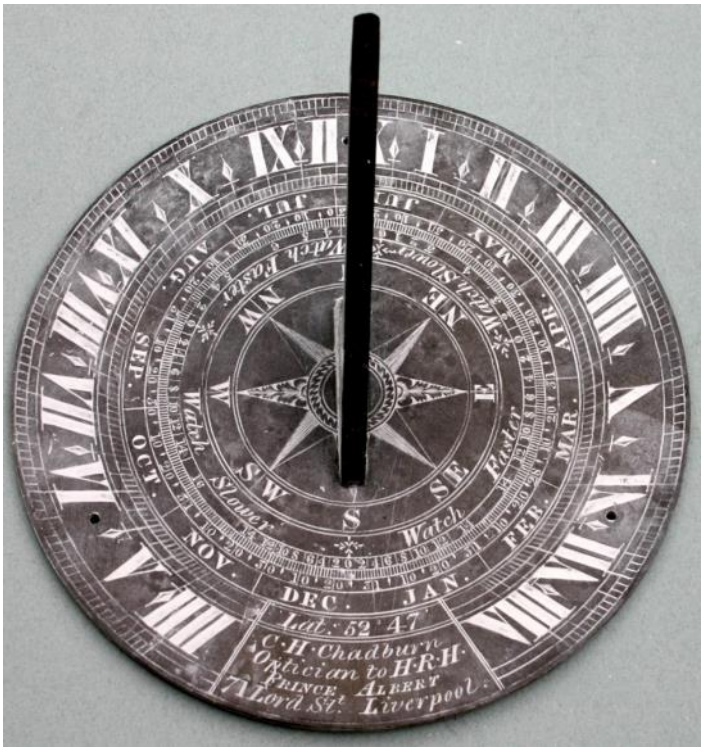

Fig. 6. Doug Bateman's Chadburn dial. Photo: Doug Bateman.

a plaque on the rear of the Liverpool Bluecoat Chambers, which records that his "generous gift in 1927 ensured the preservation of this building".

I discovered that Chadburns still had an office in the area so I went to see if they could offer any explanation. I found that they had ceased manufacturing in the year 2000. I met with their last employee who was still manning their office to respond to any queries. He remembered a Mr Chadburn arriving at the office in a chauffeur-driven Rolls Royce. He said that Chadburns would not make a one-off bespoke item for anyone unless it was as a gift to someone who had either performed a special service to the company, or who had been a personal friend of the owner.

Sadly, despite my best efforts, I have been unable to establish a definitive link between Corlett and Chadburn, but I can offer what I believe is a likely explanation.

Records show that the Chadburns' factory was bombed on 7th May 1941 when all records, tooling and stock were destroyed. Production was scattered over five premises for five years which were not restructured into a single premises in Park Lane, Bootle until 1945.[5] At the time, they were heavily involved in ships' telegraph production in support of the war effort.

It seems most likely that William Corlett was Chadburns' solicitor. He would have been heavily involved in the acquisition of premises following the bombing and also in their subsequent relocation. Corlett would have been well past retirement age – he was 75 in 1945 – but in wartime he would have continued working. Following the works relocation and the end of the war, I suggest that he finally retired and Chadburns made him the toposcope as a retirement gift.

I guess we will never know for certain.

Grammatical note: Chadburns did not use an apostrophe in their company name.

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2. Birkenhead Street Directory 1945.
3. *Alpine Journal* 1960, p. 229. *http://www.alpinejournal.org.uk/Contents/Contents_1960_files*
4. *The London Gazette*, 23rd November 1951 – 6155.
5. See ref. 1.

For a portrait and CV of the author, see *Bulletin* 26(iii), September 2014. He can be contacted at *jmikeshaw@ntlworld.com.*

MARGARET RIBCHESTER

Margaret's friends in the Society will be sad to hear that she passed away in May. She was one of our most enthusiastic dial seekers, sending in over a hundred reports since 2009, mostly from her main hunting grounds of Lancashire and Yorkshire, and many of them dials that were new to the Register. She planned her annual "progresses" around the north country with care, and usually brought back a great haul of dials. She also made many of her finds when out with her walking groups, and spread her enthusiasm to fellow group members, so that new dials turned up even when she was not rambling herself.

Margaret always claimed to have too little technical knowledge, but her reports showed how wrong this was. They were full and accurate, and enriched by historical background, and by delightful turns of phrase, as when she said "the Church of St Mary the Virgin battles for tranquillity near Eccles railway station and the M602". If you turn to her article in the *Bulletin* for September 2014 you will see her felicity of language as well as her appreciation for the skill and toil that lie behind so many dials. On the last page of the same issue you will find two of her entries for the Photographic Competition that year. She was a frequent contributor, and a prize-winner this year with her picture of the fine (and previously unreported) pillar dial at Cuerden Valley Park, Lancashire. She fought tirelessly for the restoration of decaying dials, stirring up enthusiasm and funds from church dignitaries and estate managers.

The photograph shows Margaret with her grandson – the only picture she sent where she or a fellow-walker was not behind the camera! She will be remembered with great affection.

John Foad

NEW DIALS (1)

New Sundial for Historic Garden in Switzerland

In a land renowned for its clocks and watches a Swiss couple have chosen our Orbdial sundial to mark the hours in their historic garden set on a hill above Montreux, overlooking Lac Leman, which they are restoring to former glories. The sundial has a handsome polished pedestal in pink- and yellow-veined marble from Verona. The couple wanted to see the colours of sunrise and sunset in the sky picked up by the sundial and the stone. In Victorian times this house welcomed figures from music and the arts, including Gertrude Jekyll, the influential garden designer. Its present owners are re-creating as much as possible of the original planting.

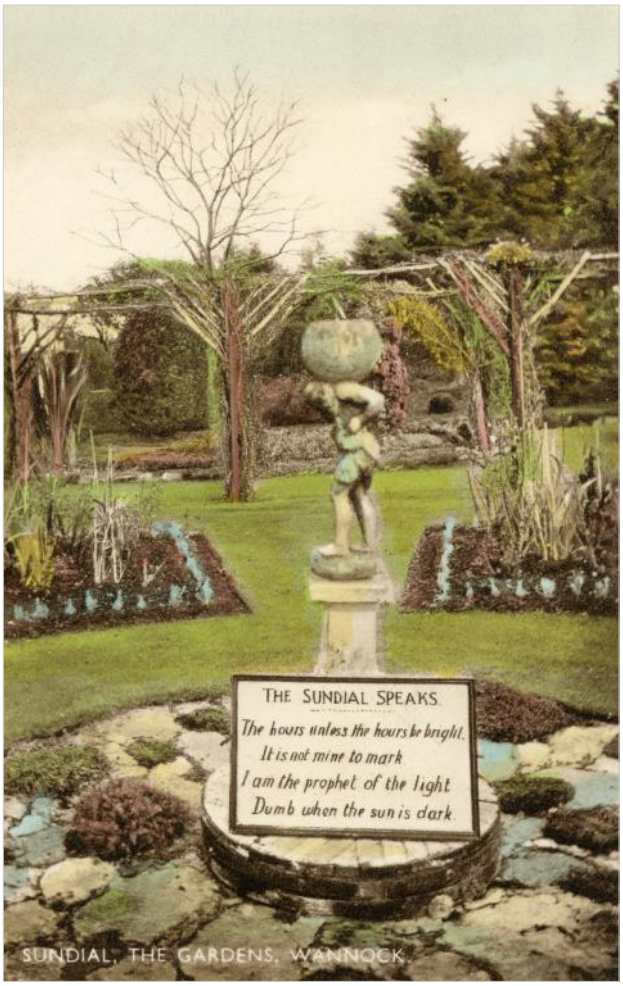
The Orbdial design is well suited to this garden and its owners. The dial plate is delineated for a horizontal dial at a particular Scottish latitude. In the Swiss location, the meridian ring has been rotated in its support by an angle that matches the difference in latitude between the two places. At the equinoxes the equinoctial ring casts a straight-line shadow onto the dial plate. The owners desired a shiny reflective piece like Orbdial and they have their own text inscribed on the gnomon.

Orbdial universal sundial by Macmillan Hunter Sundials of Edinburgh, installed in a garden in Switzerland on a polished marble pedestal.

Alastair Hunter sundials@macmillanhunter.co.uk

Postcard Potpourri 36
The Atlas Sundial, Old Mill House, Wannock, Polegate, East Sussex

Peter Ransom



Another dial that is not listed in the BSS Register, possibly because it may no longer exist. Perhaps someone in the area could do some investigation to see if anything remains. This postcard looks as if it is a coloured photograph and the frame at the base of the pedestal says:

THE SUNDIAL SPEAKS
The hours unless the hours be bright,
It is not mine to mark.
I am the prophet of the light
Dumb when the sun is dark.

Well named as the Atlas Sundial as it features a statue of Atlas with the Earth on his shoulders. The globe is missing its spherical cap so that a flat surface can accommodate the horizontal dial plate and gnomon. In the 1960s there were tea rooms and a model village here.

pransom@btinternet.com

A NEW SUNDIAL FOR AN OLD SCHOOL

JACKIE JONES

Brighton College is a public school on the south coast of England, originally designed in the gothic revival style by architect George Gilbert Scott in 1845. Later in the 19th century, an ex-pupil, Sir Thomas Graham Jackson, designed a new gatehouse tower. Owing to lack of funding it was never finished and remained as a two-storey structure for 125 years until recently when an anonymous donor paid to have the design completed. Two extra storeys and a cupola have been added following Jackson's designs but using modern techniques. Originally intended as a clock tower, it now has a clock on the north side facing the school grounds and a vertical sundial on the south, facing the city and the sea.

Smith of Derby Ltd, a long-established firm renowned for large public clocks, was responsible for the design and manufacture of the clock and sundial; I was asked, as I live locally, to help with the delineation of the dial.

Mike Fitchett, the designer at Smith of Derby, sent me his ideas for the dial plus the architect's site plans. The co-ordinates of the school are 50° 49′ 13.7″ N, 0° 07′ 19.8″ W; determining the declination of the dial proved a bit trickier. The building by this time was covered with scaffolding, so it was not possible to take an on-site reading. By using the architect's large-scale Ordnance Survey map and converting from grid north to true north, I arrived at 24° west of south. To double-check, I used a Google Maps image and laid a fine thread along the roofline of the building on the computer screen; the front of the tower and the face of the sundial were to be parallel to this. I then measured the angle between the thread and Google Maps' north–south line with a protractor. I got the same result. I was then able to work out the exact hour-line angles and the position of the gnomon to send them to Mike to produce a finished plan. A card prototype was printed and tested; it proved accurate.

The position of the dial on the tower is 19 metres above street level; I asked the construction company if they would allow me to climb the scaffolding to confirm that there was nothing to obstruct the sunlight. As you can see (Fig. 1), it was really an excuse to see the view.

The manufacturing process was then underway in Derby. The dial has a pierced metal sunburst overlaid on the face (Fig. 2); the cut-out letter B on the gnomon is for Brighton. Both are 6 mm thick aluminium, finished with a double thickness of 23½ carat gold leaf: the type that is hand-made

Fig. 1. View from the scaffolding at the height of the sundial.

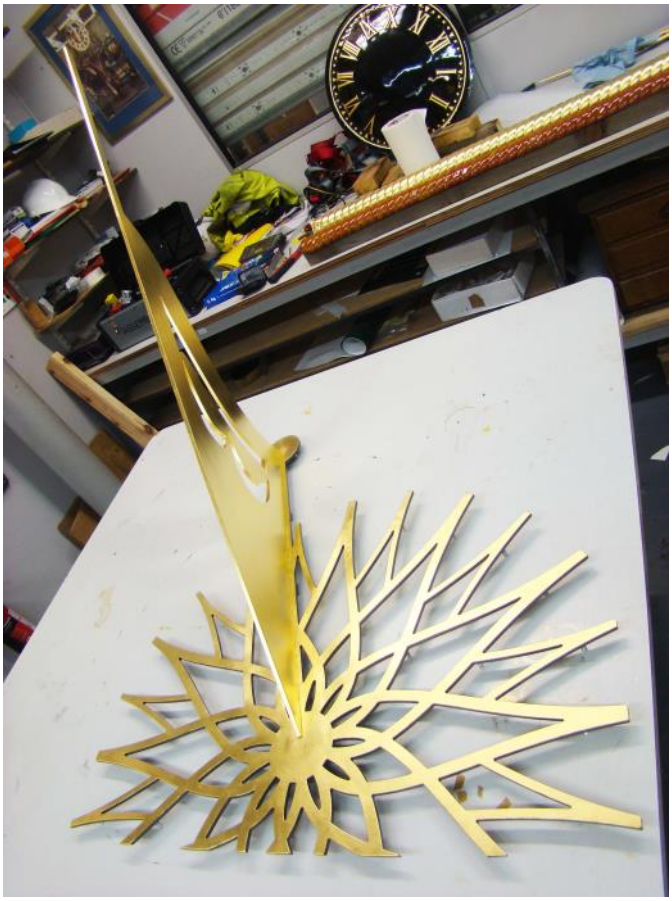


Fig. 2. The gnomon during manufacture. Photo: Mike Fitchett.

Fig. 3. Laying out the hour lines. Photo: Mike Fitchett.

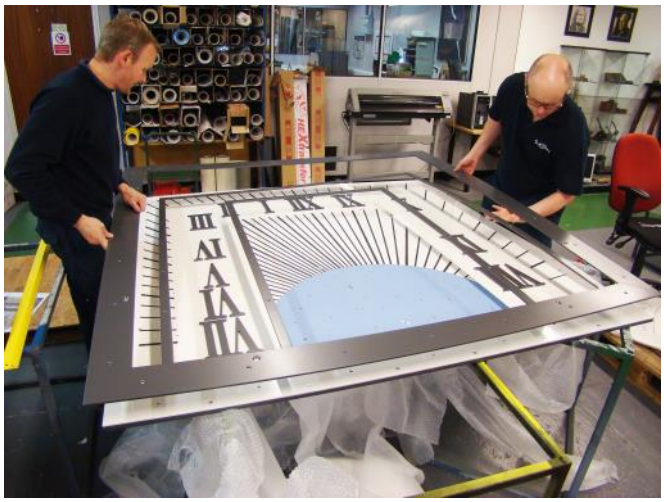


Fig. 4. Assembling the dial plate. Photo: Mike Fitchett.

Fig. 5. The finished dial in the workshop. Photo: Mike Fitchett.

Fig. 6. Close-up of the sundial on the tower.

Fig. 7. Sundial on the front of Brighton College.

and supplied on tissue paper. It then has a gold size applied to the surface which when cured will protect it.

The dial face measures 1860 mm square and is made of powder-coated (a type of paint finish) aluminium, as are the numerals. The blue background to the sunburst and the lines denoting the hours and quarter hours were computer cut from vinyl (Fig. 3).

It was all assembled in the factory (Figs 4 and 5) before being transported to Brighton and installed. Figure 6 shows a close-up of the finished dial on the tower wall; being on a busy road and in a prominent position, it is now one of the city's landmarks (Fig. 7).

For a portrait and CV of the author, see *Bulletin* 26(ii), June 2014. She can be contacted at *jackie@waitrose.com*

A UNIVERSAL DIAL BY G. WRIGHT

MIKE COWHAM

The dial described in this article is an equinoctial dial of unusual appearance (Fig. 1). It was invented and first described by G. Wright in his booklet of 1781 entitled *The Description and Use of a New Universal Dial, or, Portable Equatorial Instrument*.

The model shown in Fig. 2 was made for him by Benjamin Martin of London around 1790. It stands around 12″ high, (the exact height depending on the settings of the four levelling screws labelled B). Figs 3–8 illustrate various parts of this model.

Its inventor, G. Wright, is believed to have been Gabriel Wright. The booklet describing the dial says that it is "Printed for the AUTHOR, and sold by Messrs. GREGORY and WRIGHT, Opticians, No. 148, Leadenhall-Street. MDCCLXXXI".

The dial's three main uses given by Wright in his booklet are:

> *First, to find the Latitude of any place.*
> *The Latitude of the place being known; to find Time, by the Sun and Stars with the Dial.*
> *To find the sun's Azimuth, by the Dial.*

Initially he gives the most important details which explain how to set up the dial before use. Refer to the letters that are marked on Fig. 1.

It is essential that the dial is set up perfectly level, which is done by the four adjusting screw legs, B. These are set so

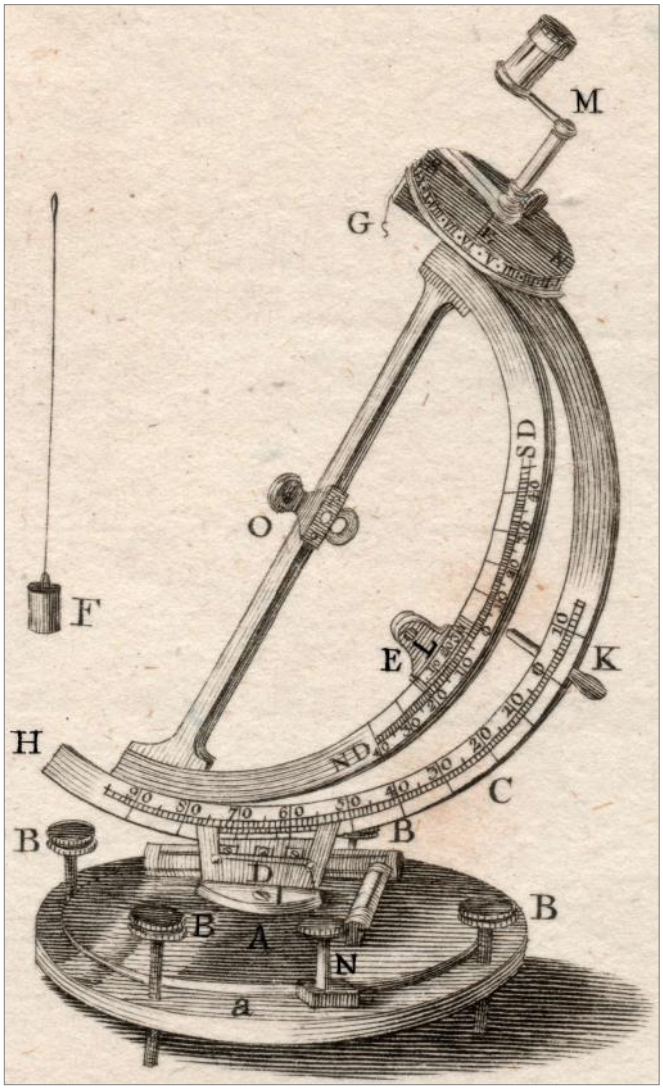


Fig. 1. 'A New Universal Dial for all Latitudes.' [1]

Fig. 2. Wright's dial as made by Benjamin Martin.

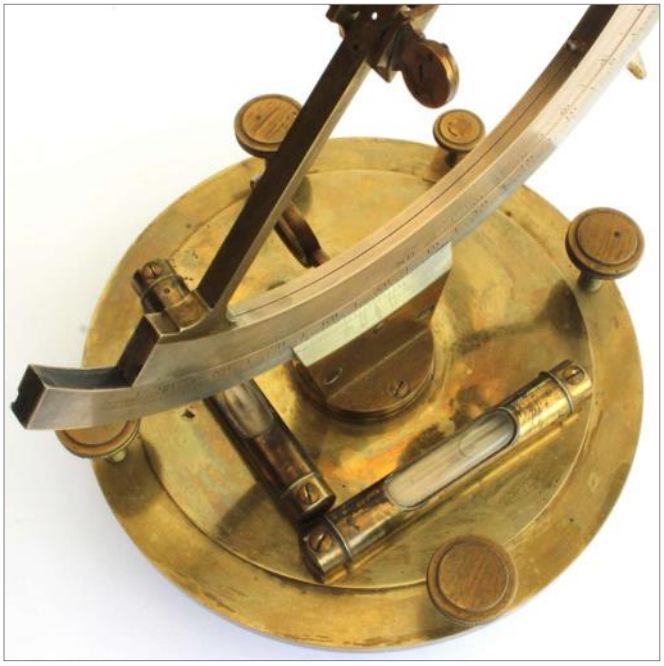


Fig. 3. View from above showing the spirit levels on the rotating base.

Fig. 4. The scale on top for reading the hours.

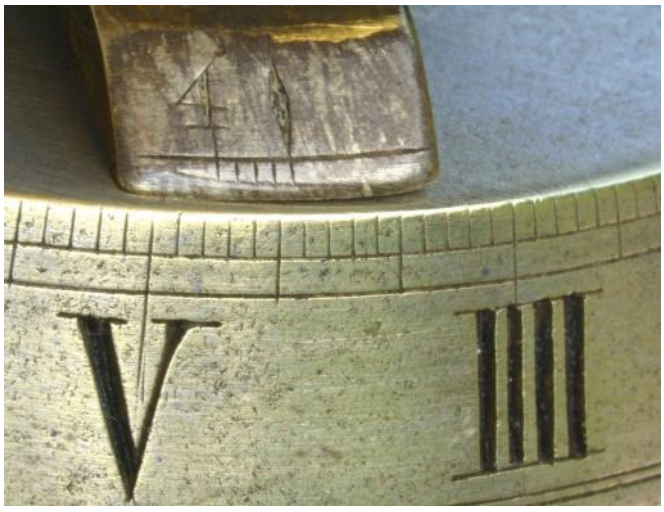


Fig. 5. The vernier scale for the hour readout, divided for every four minutes or one degree.

Fig. 6. The vernier scale on the support D, here set to 52°.

that the air bubbles in the glass tubes (spirit levels) are at their centres (Fig. 3). The dial assembly is then rotated by releasing the clamping screw N so that the horizontal plate, A, which supports the whole assembly, can rotate on top of the main base. If, in rotating the dial, any of the bubbles are then not centred, there are small adjusting screws on each tube which will allow them to be set correctly. It seems to be quite a difficult process as this will need repeating several times, certainly during its first set up, until the whole assembly is correctly set.

The next adjustment is to set the latitude arc, C, in its support, D. At first it is set to exactly 90° and is tightened by a screw at the back (not visible in the sketch). Then a plumb line is suspended from the hook at the top, G, and is checked against a line inscribed on the lower end of the latitude arc at H. This is a double check to make sure that the dial assembly is absolutely level. The plate, A, is again rotated and any errors with the bubble levels may be corrected.

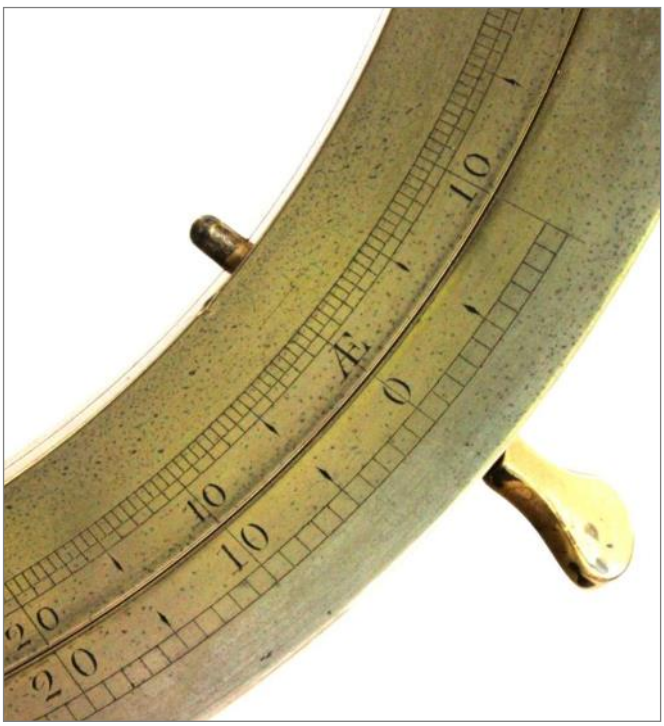


Fig. 7. The pin, K, for holding the two scales together.

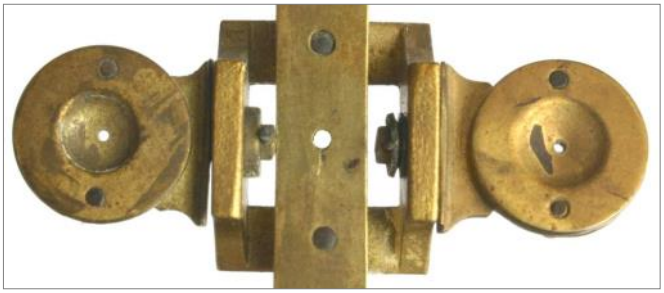


Fig. 8. The sights fitted to the central bar.

To Find the Latitude

Both arcs are now brought together and are held in this position by the pin K. The piece L (next to E) is then set to the sun's declination for the day, this being found from published tables. Then, about 15 to 20 minutes before noon get the sun's light to pass through the aperture at O and adjust the latitude arc until the spot of light falls upon the centre point of L. Then, looking carefully, watch as the sun gets slightly higher and eventually stops climbing and set the clamp, reading off the latitude from the 'nonius' or vernier scale at D. If the sun is low, Wright recommends that a correction is made for the refraction of the atmosphere. To do this, at the back of his booklet, he gives "*A* TABLE *of* REFRACTIONS *to be subtracted from the Apparent Altitudes, and added to the Zenith Distances*". The table starts at ½°, then increments in individual degrees from 1° to 90°, showing the refraction errors from 27′ at ½°, 24′ 29″ at 1° and 5′ 15″ at 10° until 90° where the error is zero.

To Find the Time

Firstly, find the sun's declination for the day "From the Nautical, or any other Ephemeris, or book that hath a correct table of the Sun's declination". Set this declination for L on scale E. Then set the latitude on the outer ring at D. On the top at M, there is a magnifying glass (but not on the Benjamin Martin model shown), to allow accuracy in setting the pointer exactly at XII against its vernier scale. Then the brass pin, K, is removed and the clamping screw at N is loosened. The dial is then rotated and the declination arc is swung until the spot of sunlight falls perfectly on L. The time can then be read from the top dial, the short vernier scale allowing it to be read to an accuracy of one minute of time. The latitude arc, C, should now be in a position which is perfectly North–South. If the sun is too weak to throw a shadow, it is also possible to sight it through the apertures from L to O to get the time, using a filter to protect the eye, if necessary.

To Find the Sun's Altitude and Azimuth

The sun's altitude may be found with the two arcs pinned together. The screw, N, is loosened and the whole assembly is rotated until the spot of light falls on a line marked vertically inside E. The part L may then be moved up or down until the spot of light is at its centre. The altitude may now be found by taking the latitude figure at D and subtracting this from 90° to give the colatitude. Finally add the declination indicated on scale E to the colatitude. This gives the altitude but note that the indicated declination is negative if the altitude is less than the colatitude. If a wider swing is required, such as when finding the altitude of a star, set L at 0° declination and move the whole assembly. Note the figure on the vernier scale at D and subtract that from 90°. The declination scale is larger than usual, being ±45°.

For the sun's azimuth, set both rings together using the pin at K and then set the latitude arc, C, in its support, D, so that it is exactly 90°. Set the top dial to XII. Remove the pin and then swing the arc, E, until the sun's spot of light falls onto the line marked vertically inside E. The azimuth may be found from the time scale, allowing 15° for each hour.

At the back of his booklet he also gives '*A* TABLE *of the Equation of Time*' for every day of the year in minutes and seconds.

The model in the photographs was made by Benjamin Martin who followed the design by Wright quite closely, with just a few small differences. Unfortunately it is now missing the two sights, L, that go on the declination scale. These are necessary for setting the declination and may be used in reverse for sighting stars etc. However, the small hole in the central bar is used for most of the measurements. This is countersunk at the back so that the rays of light are not restricted when the sun is higher or lower, such as during the periods of winter and summer. Note also that the two sights at O may be made to swivel vertically in the case where the sun (or a star) is at some distance above or below the ecliptic.

One particular difficulty is the setting of the four levelling screws. Three screws would make things easier but four, when correctly set, give a more stable instrument. Therefore, the best way to set these is to turn the spirit levels on plate A in line with these screws, then shorten one of the screws a little and adjust the level on the remaining three, using a hand to support the instrument, if necessary, where the foot has been shortened. After levelling has been achieved, the fourth foot can then be returned to be in contact with the mounting surface.

In all, this is a very precise instrument and may be used for the important tasks noted.

NOTE

1. The illustration used is not that used in Wright's booklet but is from an almost identical copy taken from an unidentified old print about dialling.

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IN THE FOOTSTEPS OF THOMAS ROSS

Part 16: Easter Coates House

DENNIS COWAN

The architects David MacGibbon and Thomas Ross co-wrote *The Castellated and Domestic Architecture of Scotland*,[1] a five-volume work published in stages between 1887 and 1892. As we know, the second half of volume 5 concerned itself with the sundials that they had encountered during the course of gathering information for their work.

Thomas Ross is generally given the credit for the section on sundials, probably because he presented a paper entitled *The Ancient Sundials of Scotland* to the Society of Antiquaries of Scotland, which was subsequently published in 1890.[2] In that paper he stated that the illustrations had all been made by himself either from sketches or from photographs. These same illustrations were used in volume 5 of *The Castellated and Domestic Architecture of Scotland* as well as the text virtually word for word, apart from some additional dials that were included in the later work.

Just occasionally a sundial would find its way into one of the other volumes of MacGibbon and Ross's work, but then it would also normally be referenced in volume 5. However, at least one example was missed.

East (or Easter) Coates House (Fig. 1) is only included in volume 2 of *The Castellated and Domestic Architecture of Scotland*.[3] Of the house, Ross says:

"This old country mansion of the seventeenth century was formerly in the western suburbs of Edinburgh, but during the last fifty years the town has greatly extended in that direction, and has completely surrounded the old mansion. It now stands in the grounds attached to St. Mary's Episcopal Cathedral, having been bequeathed, along with the lands adjoining, by the late Misses Walker for the purpose of building and endowing the Cathedral.

"The angle turrets of the south gable are very large for their position, and reduce the gable to a small slip of wall between them. This is a good example of the manner in which the gable came to be engulfed by the angle turrets. As often happens in late houses, the angle turrets are of sufficient size internally to be used as small dressing-rooms.

"The dormers are finished in the simple manner not uncommon in seventeenth-century work, i.e. the gablets are built with ashlar, the edges of which are cut so as to form the skews, without any moulding or separate coping on the slope, but with a small moulding at the 'putt' or springing. They are also crowned with the pattern of finials, then

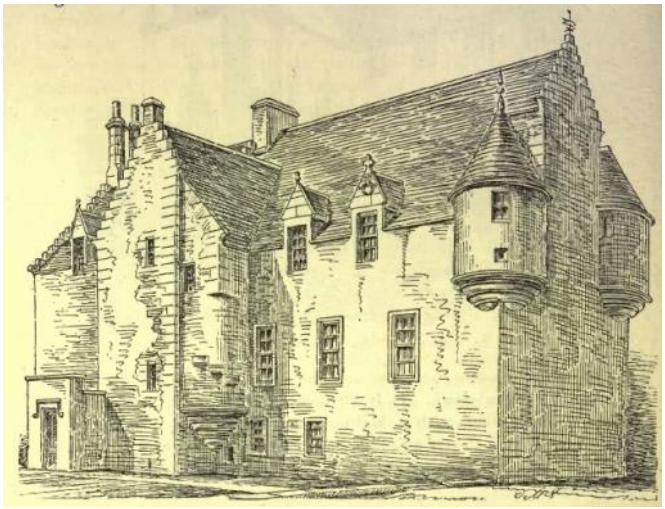

Fig. 1. Ross's sketch of Easter Coates House showing the sundial on the nearest turret.

almost universal, viz., the Rose, the Thistle, and the Fleur-de-lis; and the south-west angle turret bears the never-failing sun-dial.

"The southmost dormer in the sketch contains a shield, with the date 1615, and the initials I. B. and M. B. [Fig. 2]. *The former are those of John Byres, an Edinburgh merchant of eminence, by whom the house was built as a country residence. It is not clear for whom the initials M. B. stand. They would in this position naturally represent the proprietor's wife, but the monument in the Greyfriars'*

Fig. 2. The southmost dormer today showing the date and initials.

Fig. 3. The Easter Coates sundial on the south west angle of the building.

Churchyard to the memory of 'John Byres of Coites' mentions that it was erected 'by his wife A. S. and children.' [4] *Sir John died in 1629, after having filled for six years the office of Treasurer of the City, for two years that of City and Suburban Bailie, six years Dean of Guild, and two years Lord Provost.*

"Amongst other changes which this old mansion has undergone, a north wing has been added to it, in which many of the quaintly carved stones with curious inscriptions from the demolished houses of the Old Town of Edinburgh have been introduced and preserved. It is said that amongst other stones here inserted was the lintel from the town house of the worthy merchant, situated in Byres' Close (doubtless named after him), and which was demolished about fifty years. The lintel is stated to have contained the initials of Sir John and his wife, with the motto, 'Blessit be God in all his gifts', but no trace of it is now to be found. Carved stones from 'the French Ambassador's Chapel' and other buildings taken down when the 'South Bridge' over the Cowgate was erected, have also been preserved, either in the building or in the grounds of Coates House."

In the quite extensive text, only part of which is reproduced here, there is only the briefest mention of the sundial with no description of it whatsoever. This is surprising considering that it is, in my opinion, a fairly important example. So why was it virtually ignored?

Volume 2 was published three years before Thomas Ross presented his paper on *The Ancient Sundials of Scotland* and five years before volume 5 was published. Could it be that Ross had not yet developed his interest in sundials? In fact, in *The Ancient Sundials of Scotland,* Ross says that it was his publisher David Douglas who suggested that he produce the paper in the first place, and presumably was keen for it to be included in the later work too.

Or could it have been that David MacGibbon was the lead on Easter Coates House and Ross had no involvement? Notice the spelling that was used (sun-dial). This spelling was in common use in Victorian times, but it was not a spelling that Ross used either in *The Ancient Sundials of Scotland* or in volume 5.

My own view is that it was probably a combination of both of the above. MacGibbon was the lead on Easter Coates House whilst Ross had not yet developed his interest in sundials, and because of the very brief mention, he missed it when he compiled his initial paper.

But what of the sundial itself? The only comment made is that it is on the south-west angle of the building (Fig. 3). This is in common with many 17th-century Scottish churches, although as can be read from the description above, Easter Coates House was a private dwelling and never a church.

The dial does bear some resemblance to a type of which there are only four known examples,[5] three of which are on churches (Figs 4, 5 and 6) with another at Seton Palace in East Lothian (Fig. 7). The significant difference is the lack of a semi-cylinder on the Easter Coates example although there are other differences. The main similarity, other than the general shape of the stone block, is the proclining face on each of the dials.

Fig. 4. The sundial at Cockburnspath.

Fig. 5. The sundial at Fogo.

Fig. 6. The sundial at Oldhamstocks.

Fig. 7. The sundial at Seton Palace.

Fig. 8. Easter Coates sundial's proclining face.

The Easter Coates dial's proclining face is south facing and several Arabic numerals and hour lines can still be seen as well as the remains of the gnomon (Fig. 8). It also has east- and west-declining dials with only the east-declining dial having any remaining Arabic numerals (Figs 9 and 10), but both dials have gnomon holes. There is no evidence that there have been dials on the vertical faces at the cardinal points.

How old is this dial? The three similar dials on churches are thought to be contemporary with their buildings and this would make them late 16th or possibly early 17th century. This ties in nicely with Easter Coates House's date of 1615. So was it part of the original building? Well, maybe but maybe not.

As can be noted from the description of Easter Coates House, many carved stones from the demolished houses in Edinburgh's Old Town were preserved at Easter Coates, although mostly at the north wing. Of course if the sundial was one of them, it wouldn't have been sited to the north at Easter Coates but would have been placed logically in its current position. It could possibly have been relocated from an Old Town church, or could it have come from the French Ambassador's chapel mentioned by Ross? However, that doesn't necessarily change its likely date which I am still inclined to think is early 17th century.

Fig. 9. Easter Coates sundial's east-declining face.

Fig. 10. Easter Coates sundial's west-declining face.

My original article ended here, but I still had a nagging thought that maybe the upper horizontal surface of the dial block contained a sundial. The only way to find out would be to gain access to the window in the turret above the dial.

The house in recent times has been used for the Cathedral's music school, so I thought the best option would be just to turn up at the door. Alas, when I did so, it was being used as a nursery school. Using the intercom, it was suggested that I phone their Head Office and I was given their phone number. The young lady there said as they only leased the building I would need permission from the Cathedral. On contacting the Cathedral they said that it was OK with them, but I would need permission from the nursery. When I phoned the nursery's Head Office again, I was asked when I would like to make an appointment. On explaining that I was standing at the door, she quickly said that she would get Paul the janitor to meet me and take me up to the turret.

Paul arrived very quickly and immediately asked if I knew of the sundial at Pilrig House in Edinburgh (Fig. 11). When I said that indeed I did and thought that it was a fine example, he said that he was a stonemason by trade and that he had carved it in the 1980s and was paid £1,800 for it. We were best friends from that point on!

When we arrived at the turret room, it was full of the nursery's soft play equipment which we started to remove. Immediately one of the young children asked why we were getting the soft play stuff out, as it wasn't time for it yet!

Fig. 11. The sundial at Pilrig House carved by the Easter Coates janitor in the 1980s.

Fig. 12. The upper horizontal dial face at Easter Coates viewed from the small window above.

At last we gained access, but the window was jammed. Undaunted, my new friend Paul pulled a screwdriver from his pocket and soon the window was open. There was a sundial (Fig. 12) on the upper surface!

In my mind, that changed things. If you were to site a sundial under an upper floor window in the 17th century, then you would logically have a dial face on its upper horizontal surface, so that you could just pop your head out of the window to check the time.

So although the dial could have come from a similar building in the Old Town, I now conclude that the sundial is original to Easter Coates. However, like the Courts of Law in Scotland's ability to have a 'not proven' verdict, there is insufficient evidence to support my conclusion.

ACKNOWLEDGEMENTS

Many thanks to the young ladies at the nursery's Head Office and at the Cathedral who responded positively to my request when I gave them no advance notice at all, and in particular to Paul the janitor/stonemason who likewise was most helpful.

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NEW DIALS (2)

A New Islamic-Inspired Sundial

The photograph shows the latest sundial from the hands of Frank King and the Cardozo Kindersley Workshop in Cambridge. In common with many ancient Islamic sundials the dial plate is marble. The gnomon support also shows Islamic influence. The dial is 500 mm in diameter.

The Ω shape symbolises a *Mihrab*, the apse-shaped recess found in the wall of a mosque. This indicates the direction of the *Kaaba* in Mecca. On the dial, an arrow indicates this direction, or *Qibla*.

Readers will quickly note the low gnomon angle. This dial is for a location in the Tropics. Unfortunately the sun was in short supply so a spotlight was used to cast the shadow.

The shadow of the gnomon is as for 12 noon which heralds *Dhuhur* prayer time. The shadow of the nodus indicates noon on the day of the summer solstice.

The sundial is for a latitude north of the equator so the upper end of the gnomon is the north end. At the summer solstice the sun is due north at 12 noon so the shadow of the rim of the dial on the protective carpet is towards the south.

The central region shows Babylonian hour lines from 1h to 12h and Italian hour lines from 12h to 23h. To avoid cluttering the design, neither family of lines has any hour numbers. Muslim users can interpret the Italian hours hour lines as counting down to sunset which heralds *Maghrib* prayer time.

The original design incorporated the line that indicates the time of the afternoon prayer, *Asr*, but the client felt that this spoilt the balance of the central region so this feature was removed.

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READER'S LETTER

Orologi Solari Scores 10

As an Italian member of the BSS I am pleased to inform you that the Italian sundial magazine *Orologi Solari* has just published its tenth issue.

Orologi Solari is a free on-line magazine that can be downloaded from the website *www.orologisolari.eu*

First published in 2013, it took forward the legacy of the earlier Italian sundial magazines *Gnomonica* (1998–2001) and *Gnomonica Italiana* (2002–2011).

The magazine is edited by a group of Italian sundial enthusiasts managed by Luigi Ghia. Among the authors you will find the well-known gnomonists Alessandro Gunella and Gianni Ferrari. Amongst the articles in this issue are a description of a multiple sundial at Castletown on the Isle of Man and a discussion of a historical meridian line in Florence (Italy).

Each issue comes with a 'digital Bonus' comprised of documents, images, software or spreadsheets, etc.

The articles are mainly in Italian, but some of them are also in English. Articles in English are welcome, and will be published in an Italian translation and possibly also in the original version. The editorial team can be reached at *redazione@orologisolari.it*

Francesco Caviglia
Turin

A VISIT TO WORLD MUSEUM, LIVERPOOL

DOUGLAS BATEMAN

As part of the preparations for the recent BSS Conference in Liverpool, Mike Shaw was able to organise a visit to World Museum on the Friday afternoon for a small group before the conference began.

The curatorial staff took out of store a number of dials for us to examine. They were mainly small portable dials, but what attracted particular attention was an 18th-century dial by Kock or Koch of Vienna (Figs 1 and 2). The hour scale is elliptical in shape which gives a better spacing of the 15-minute markings. This is reminiscent of Oudemans' Curve which has been mathematically analysed by Fred Sawyer in the *NASS Compendium*.[1] This study was in turn inspired by a note in the *BSS Bulletin* by R.P.M. Holliday entitled 'Umkhonto We Langa Sundials', with a loose translation from Zulu meaning 'the spear of the sun'.[2] The latter alludes to the shape of the dial with the unusual elliptic scales. As Fred pointed out, equal intervals on this curve correspond to equal time intervals covered by the gnomon's shadow.

Fig. 1. Assistant curator Wendy Simkiss, Fred Sawyer and Tony Moss examining the Koch dial.

Another dial that caught our eyes was a dipleidoscope by Dent (Figs 3 and 4). This optical instrument may be used to

Fig. 2. The Koch dial showing elliptical scale that gives near-equal 15-minute markings. Courtesy National Museums Liverpool, World Museum Liverpool.

Fig. 3. A Dent dipleidoscope for determining local noon by 'tracking' reflections of the sun from the combination of mirror and prism.

confirm local noon with some precision, assuming it is placed on a predetermined meridian. The structure appeared to be capable of hinging, but the iron base and vertical were quite badly corroded.

One of Dent's dipleidoscopes was exhibited at the Great Exhibition of 1851 and was described in the Official Catalogue:[3]

"A patent dipleidoscope, to be used as a fixed meridian instrument. The optical arrangement consists in two silvered parallel reflecting glasses placed at an angle of about 60° behind the front glass. The image of the sun is reflected from the front glass, and the sun's rays which pass through, impinge first on one plane, and are reflected to the other, they then pass out through the front glass. By this optical arrangement, two suns are visible to the eye of the observer moving in opposite directions, and when they coincide, it is the instant of apparent noon. The time can be ascertained by this instrument with considerable precision. The dipleidoscope allows of three observations of the sun: 1st, when the limbs touch; 2nd, when the images coincide; and 3rd, when the limbs separate."

Charles K. Aked gave a comprehensive description of the origins and functioning of the dipleidoscope in the June 1993 *BSS Bulletin*.[4]

Fig. 4. Prism cap of the "Patent Meridian Instrument" by Dent at 61 Strand, London.

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HOLIDAY PICTURES (1)

Peter Meadows

While on holiday in Stavros, Crete we visited the nearby town of Chania. Outside the Nautical Museum of Crete in the picturesque Venetian harbour is a horizontal sundial with explanatory plaques on the sides of the pedestal.

The front plaque states that it was installed in July 2011 with the delineation by a retired Rear Admiral H.N. Oikonomopoulos. The English translation on the plaque refers to this being a 'Flat Sundial'. The three other plaques give the Equation of Time correction required for each half month in English, French, German, Russian, Italian and Spanish (the dial itself gives this information in Greek).

The holes in the gnomon appear to be just for decoration. A web search reveals that this is not the original: there are several pictures of the dial with a more flimsy but more elegant gnomon incorporating an anchor. It appears that this gnomon has been damaged or stolen and replaced at least once since 2011.[1]

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AN INTERESTING FRENCH DIAL

MIKE COWHAM

The dial in this article is a modern one placed on the end wall of a school in the French village of Thizay near to Chinon in the department of Indre et Loire.

It was constructed there in 2001–2 by pupils at the school (Fig. 1). Their first names are shown on one of the tiles below the dial. The dial is declining towards the east and its hour lines are formed by two circles of dots with the hour numerals VI to XIII on individual tiles. The root of the gnomon originates from near the centre of a map of France, just about at the point where the village of Thizay is situated (Fig. 2). It is, though, set at completely the wrong angle.

Fig. 1. Dial on the school wall at Thizay.

Fig. 2. The gnomon root originating from the position of Thizay in the map of France.

The village is close to the river Vienne which flows into the much bigger river Loire, which is about 5 km further north. Therefore, its villagers would have been familiar with various boats. The dial has some interestingly designed numerals, each showing the image of a ship or sailing barge.

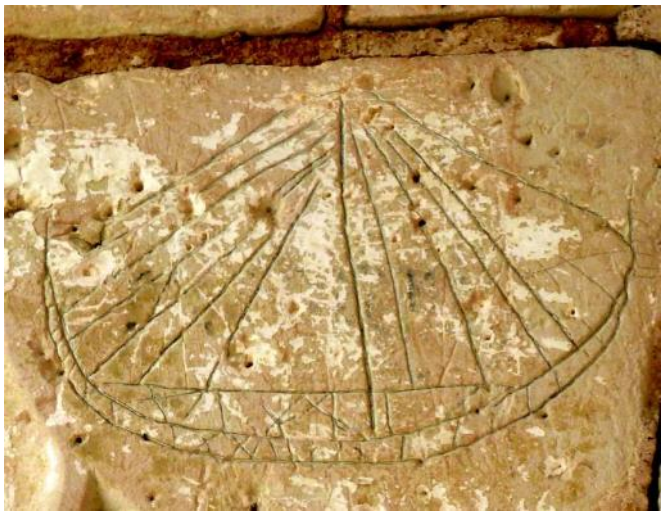

Fig. 3. 'Mass dial' at Thizay.

Fig. 4. Numeral VII at Thizay.

Fig. 5. One of the barges engraved on the wall of the church of St Germain-sur-Vienne.

Fig. 6. The numeral XIII showing a barge at the church at St Germain-sur-Vienne.

Below the dial is a tile showing the three nearby villages where the original images for each barge came from. These images are all taken from graffiti on the walls of their churches. Two of these barges are on Thizay church which is just a few metres away from the school. We had already looked at the church, searching for its various mass dials, and one in particular was placed over a south doorway (Fig. 3). It was a little unusual but appeared to be a rather crude mass dial. We found out later that this is *not* a dial but is really the picture of a sailing barge. This image is depicted on the school dial next to the hour numeral VII (Fig. 4).

Figs 5 and 6 show one of the barges engraved on the wall of the nearby church of St Germain-sur-Vienne and its equivalent on the school dial next to the hour numeral XIII.

The list of the three churches whose graffiti images were used for each numeral was quite interesting. Each of these churches also has some real mass dials (Figs 7 and 8). They are also engraved with several fine images of various types of barges. Like mass dials, they generally seemed to be

Figs 7 and 8. Two of the real mass dials at Thizay.

Fig. 9. A barge on the wall of the church at Couziers.

Fig. 10. A barge on the wall of the church at St Germain-sur-Vienne.

on the south wall of each! (We have seen such vessels on churches in other parts of France, but this group were all placed within close proximity to each other, and close to the river Vienne.)

Figs 9 and 10 show just two of the other more exciting sailing barges that litter the walls at both Couziers and St Germain-sur-Vienne, but the length of these boats would have been too wide to be included on the square format tiles of the dial numerals at Thizay.

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"COME, LIGHT! VISIT ME!"
. . . A Sundial Revealed

IAN BUTSON

When viewing sundials, dialling enthusiasts may be frustrated by heavy clouds that obscure the sun, or by the dial itself being situated beneath overhanging trees or bushes that prevent the sundial from displaying the time as was intended.

In the small Buckinghamshire town of Beaconsfield, until earlier this year, a vertical sundial was completely hidden from direct view by the branches of a large magnolia tree growing by its side (Fig. 1).

Fig. 1. Magnolia tree growing by the side of the dial.

The dial is fitted in the lower half of an infilled sash window at the second-floor level of King's Head House, which overlooks the London Road, close to the centre of 'Old' Beaconsfield.

Fig. 2. Typical view of dial from below, before pruning.

Until recently, the only views of the sundial that had been possible were from an oblique view taken almost vertically from the footpath beneath the dial (Fig. 2). Owing to the covering vegetation the dial was rarely capable of functioning properly as it was intended.

Earlier this year it was noticed that the magnolia tree had been heavily pruned by removing the growth covering the front of the dial's face, enabling it to be seen directly without obstruction (Figs 3 and 4).

Fig. 3. View showing pruned magnolia tree, exposing the dial.

Fig. 4. The dial face now fully exposed.

Fig. 5. Shadows cast from tree during the afternoon.

Fig. 6. Dial illuminated by the morning sun.

However, although the tree growing to the left-hand side of the dial had now been severely cut-back, unfortunately the shadows falling from the upper branches of the tree largely obscured the dial's face during the afternoon hours (Fig. 5).

King's Head House is a Grade II Listed building; it originates from the 16th and 17th centuries, but is now used as offices. Inscriptions on the sundial record some past history of the house, it being embossed with "ESSEX HOUSE 1580", "KINGS HEAD 1714" and with a beaming sun-face now on view proclaiming "TEMPUS FUGIT 1925". The dial, possibly made of lead, is recorded in the BSS Register as SRN 6098.

And, what a difference the sunshine makes (Fig. 6)!

The moral to this part of the story: If you wish to know the solar time in Beaconsfield, make sure to plan your visit for the morning!

However, further caution is still required. King's Head House declines by approximately 14 degrees to the east of south, but as can be seen from the photographs, the sundial as fitted is delineated as a direct south-facing dial. As a consequence this dial indicates the time as being somewhat earlier than the true solar time at Beaconsfield. During the early part of the morning this difference is about 20 minutes, progressively rising to about 30 minutes at noon, and then reducing similarly during the afternoon.

This difference might, perhaps, afford one the opportunity to seek some refreshment at a local tea shop before any all-important appointment in the town. But, be prepared to check for the correct time on your pocket watch anyway!

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WEYBRIDGE HOSPITAL SUNDIAL, ANOTHER MYSTERY!

MARTIN JENKINS

I recently read a fascinating book about the life of Sir Stewart Gore-Browne.[1] It tells of his passion for building and developing an 'English style estate' at Shiwa Ngandu, in Northern Rhodesia, now known as Zambia, in 1922. He died at the age of 84 in 1967, having led an extremely full and distinguished life, mostly in Africa. He remains the only white man in Zambia to have received a state funeral and chief's burial.

Stewart Gore-Browne's aunt was Dame Ethel Locke King who was married to Hugh Fortescue Locke King (1848–1926). They were the owners of the Brooklands Estate in Surrey. The Locke Kings built the famous Brooklands racetrack and aerodrome. In 1936 the Brooklands estate was sold, the main house being sold to the Vickers Aircraft company and the racetrack to another company. However, Dame Ethel moved to another large house on the Brooklands estate called Caenshill House. In 1956 Dame Ethel died at the age of 92 and Caenshill House was sold to the Vickers Company for use as a training centre. Many of her effects were given away and in the book it mentions "*the sundial from the garden delivered to Weybridge Hospital*".

Eventually Caenshill House became a residential conference centre for Brooklands College and was subsequently sold off in 1995 for redevelopment into a block of apartments.

Weybridge Hospital was opened by Princess Beatrice in 1928, so was well established by Dame Ethel's death in 1956 when the sundial was given to the hospital. Given that the Locke Kings were extremely wealthy it is likely that the dial was of very good quality. There is no record in the 2015 BSS Register of a sundial at Weybridge Hospital; does anyone know of the dial's existence or whereabouts? Maybe a member in the south east could do a bit of investigating and update the Register?

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HOLIDAY PICTURES (2)

These pictures of a large sundial on top of a high sand dune on the Curonian Spit in Lithuania were sent to David Payne by his friend Charles Bartram. There was an explanatory plaque in English:

"The horizontal Sundial – a calendar, designed on the basis of the traditional gnomonic (science of the sundial design) principles and invoking modern mathematical techniques, was built on Parnidis Dune in 1995.

"A decorative granite sculpture was erected on Parnidis Dune, emerging 53 meters above the sea level. This is an ideal place for this kind of sundial as an absolute mathematical horizon opens up from the Dune. It is possible to observe the Sun rising from the Lagoon and setting into the sea.

"The stela sheds a shadow on the system of stairs, in which the steps are raising up to noon. One step signifies one hour. The rows of lightest stone steps signify months, rows of grey stone equinoxes and solstices, and black stone the dark time of the day.

"There is an obelisk in the centre of the square, decorated with the symbols from the traditional festivals and phonological [sic] *events from the rune calendars. The obelisk, the height of which was reaching 12 meters, was broken down by the Anatoliy hurricane in 1999. The Sundial was designed by architect Ricardas Kristopavičius, sculptor Klaudijus Pudimas and Professor Dr Libertas Klimka."*

SALTCOATS, SUNDIALS, STORMS

CHRISTINE NORTHEAST

In Saltcoats, a small town on the Firth of Clyde, there is a vertical dial (SRN 2062) whose entry in the BSS Register notes that it is on a "house end wall", possibly made of wood and with a metal gnomon. The description continues:

"An east-declining dial with hour numerals for Summer Time, with GMT in smaller numerals in an inner ring. A plaque below once bore an inscription, but it is very worn. More information requested."

In researching the history of an ancient multiple dial (SRN 1497) at nearby Ardrossan, I planned to spend many hours at the North Ayrshire Heritage Centre; because this is situated in Saltcoats, it seemed reasonable to spend some time looking for the Saltcoats dial and, perhaps, to discovering "more information".

The description "house end wall" indicated that the hunt for the dial might not be straightforward, with so many houses in Saltcoats from which to choose, but in fact it was quite the opposite: to my surprise, the dial turned out to be on the south wall of the Heritage Centre itself, formerly the parish church of Ardrossan (Figs 1 and 2).

Fig. 1. North Ayrshire Heritage Centre showing the dial and tablet high on the south wall, below the pediment.

A Replacement Dial

In the late 1970s, BSS member Douglas Hunt frequently passed this building, then known as the North Ayrshire Museum, on his way to the cinema and noticed that there was a sundial on the south wall in very poor condition, and missing its gnomon. He therefore designed the present dial as a replacement and delineated it to show sun time at

Fig. 2. The dial and the worn stone tablet.

Greenwich rather than local time (at 4° 47′ W); lines connect the summer and winter hour numerals. He made the gnomon from 1/8″ aluminium and then painted it with Hammerite. The stone was cut by a local stonemason, Alex Bingham of West Coast Memorials.

The wall of the building is, indeed, east-declining, but the dial and the associated stone tablet below are canted (Fig. 3) so that they are both direct south-facing.

An Earlier Dial and the Stone Tablet

More than a century before the present dial was installed, its predecessor was described as "obliterated" by William Dobie (who was then preparing a history of churches in

Fig. 3. The tablet and dial from below.

Fig. 4. The building in the early 1960s, with the gnomon still in place on the original dial. Photo courtesy of the North Ayrshire Heritage Centre.

Ayrshire),[1] although a photograph of the building from the early 1960s shows that a gnomon was still in place at that time (Fig. 4).

It seems likely that the earlier dial and the rectangular stone tablet beneath it were associated in some way, as they are co-planar; it is unusual to find a canted tablet as here.

The inscription on the tablet is now considerably worn so as to be almost illegible, but according to William Dobie it originally read:

POST VARIOS CASUS DUM IN ALIIS LOCIS SITUM HOC TEMPLUM TUM DEMUM HIC EXTRUCTUM ANNO MDCCXLIV. INTERJECTO DEINDE TEMPORE CUM NIMBORUM PROCELLARUMQUE SAEVITIA IN RUINAS FERE CONQUASSATUM FUNDITUS DENUO, RENOVATUM ERAT ANNO MDCCLXXIII.

ET POST XIII ANNOS LAQUEARI NOVO EXORNATUM, VID. ANNO MDCCLXXXV.

The final sentence refers to decoration added to the church thirteen years after it was built here, and it is possible that the tablet and dial were installed together to celebrate this improvement. The first two sentences are more intriguing and hint at a history worthy of further investigation; a book celebrating the quatercentenary of the burgh of Saltcoats in 1928[2] offers the following translation:

"After a succession of casualties, while situated in other places, this church was finally reared here in the year 1744. Then after the lapse of a considerable space of time, having been almost shattered into a ruinous condition by the violence of winds and storms, it was entirely built anew in the year 1773."

The Story of a Moving Church

Perhaps confusingly, the boundary between the parishes of Ardrossan and Stevenston formerly ran through the centre of Saltcoats, so although the most populous part of the parish of Ardrossan was soon to be found around Saltcoats harbour, the first church was built close to Ardrossan Castle, about 2 km away. The foundations of this original church may still be seen on Castle Hill (Fig. 5). This building, only 19.5 × 7.8 metres and on what must have been a very exposed site, was blown down by a violent storm in 1695[3] and services were temporarily moved to a malt-kiln on the Kirkhall estate, 2 km inland.

A more permanent structure was erected in 1697, using materials from the original building, at the small settlement of Stanley Clachan, bordering the Kirkhall estate but in a more sheltered position.[4]

The position might well have been more sheltered, but it was a long walk for the citizens of Saltcoats, who comprised the most populous part of the parish, so in 1744 the church was taken down and rebuilt on its present site, the third. The site at Stanley Clachan became the private burial ground of the Weir family of Kirkhall, which included Robert, the maker of the Ardrossan multiple dial as described in the March 2015 issue of the *Bulletin*.[5] No trace of the second church remains.

It seems that reusing the materials of the successive buildings resulted in an unstable structure, for

"In February 1773, Mr Dow, the then minister of the parish, reported to the presbytery, 'that the church of Ardrossan had been so much shaken by the storm upon the 20th of last month, that the parishioners ever since had assembled in it with terror'."[6]

So it was that the present building, the fourth and last, was erected, presumably with better materials, and was later to be improved and given its sundial and commemorative tablet.

In time, this new church became insufficient for the growing population, not only of the town of Saltcoats, but also of the new town being constructed round Ardrossan harbour (whose inhabitants were now the ones with the long walk to church!). Eventually, the parish was split, and this church was superseded by two new larger ones, the New Ardrossan Parish Church (1844) in Ardrossan town and St Cuthbert's (1908) in Saltcoats.

The old building was used as a church hall from 1908 to 1939 when it became the Headquarters of the Home Guard. From 1945 to 1957 it was used as a furniture warehouse by a local businessman, but opened as the North Ayrshire

Fig. 5. Remains of the original church on Castle Hill, Ardrossan.

Fig. 6. Large horizontal dial near Saltcoats harbour.

Fig. 7. An opportunity missed?

Museum in 1957. The Museum and Local and Family History merged in 2010 and the building was rebranded as the North Ayrshire Heritage Centre in 2011.

Another Saltcoats Dial – and Friend?

Even more modern than the Heritage Centre dial is a large ground-level horizontal dial (SRN 7672) near the harbour (Fig. 6). From this dial one can see, some way along the promenade, and apparently echoing the gnomon of SRN 7672, what appears to be another substantial gnomon. Alas, although it is aligned north–south, on closer inspection it turns out to be an anchor, not quite polar-oriented (Fig. 7). An opportunity missed, perhaps?

ACKNOWLEDGEMENTS

With many thanks to Douglas Hunt for information about his replacement dial, and to Hazel Menzies for permission to reproduce Fig. 4 and for the information about the North Ayrshire Heritage Centre building 1908–present.

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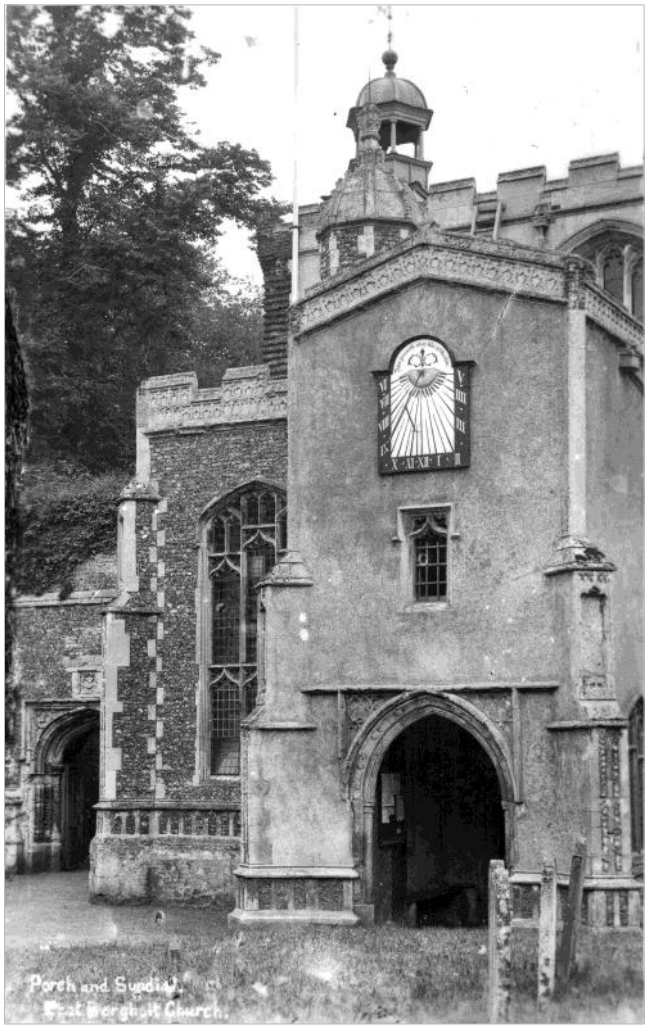
Bonus Postcard – East Bergholt



This postcard, from John Davis, shows the dial on the south porch of the church of St Mary the Virgin, East Bergholt (SRN 0312). The church is noted for the unique bell cage nearby; the bells are rung in a particularly hands-on fashion (there are no ropes!) which is both loud and dangerous. In 1816, the rector's granddaughter married John Constable, the celebrated 19th-century painter.

FHK

A SUNDIAL PUZZLE FROM GOUDA

DOUGLAS BATEMAN and FRANK H. KING

Many readers will have heard of the city of Gouda in Holland, if only for the cheese that bears the same name. In 2015, one of us (DB) visited this city and, on return, submitted the photographs in Figs 1 and 2 to the Editorial team. In the accompanying message he wrote of Fig. 1:

> Hear the time from the bells in a fog,
> See the clock on a cloudy day,
> Check the sundial in sunshine.

Commenting on Fig. 2, he added, "Frank and John will cover my embarrassment by explaining the 'secondary dial' ".

Fig. 2. The direct east-facing sundial.

John Davis was the first to respond, noting "I have seen quite a lot of direct south dials canted out to face south but never a pair at right angles like this". He described the direct east-facing dial as "a bit of a puzzle".

As the current holder of the post of University Bellringer and Keeper of the University Clock in Cambridge, Frank King found Fig. 1 irresistible: bells, a clock, a sundial pair and even clear blue sky. What more could one ask for in a single photograph?

Google Maps provided the location details. We are looking at the south-east corner of the Stadhuis (City Hall) in Gouda whose geographical coordinates are:

Latitude 52.01147° N, Longitude 4.71054° E

A sundial and a clock in close proximity makes it hard to resist the temptation to check for consistency. Inspection of Doug's JPEG file showed that the photographs were taken on 8 October, when a combination of the Equation of Time

Fig. 1. A canted sundial pair, a clock and a collection of bells.

and the longitude offset from Greenwich suggests that a sundial in Gouda should be about 31 minutes ahead of GMT.

The south-facing dial indicates that sun time is around 09:30 which equates to 08:59 GMT. Central European Summer Time did not end until 25 October and 08:59 GMT equates to 10:59 CEST. The Stadhuis clock shows 11:08 so there is a discrepancy of nine minutes. We have all seen worse!

The direct east-facing dial in Fig. 2 does indeed seem to be a bit of a puzzle but a brief look at the dial in Fig. 3 provides all the necessary clues.

This is the direct east-facing dial on the Gate of Honour at Gonville and Caius College in Cambridge (SRN 1716) whose latitude is a small fraction of a degree north of that of Gouda.

Both dials have a nodus. That in the Gouda dial is a small gold ball supported by a horizontal rod. The nodus in the Caius dial is also a small gold ball but it is set into a gnomon so it is harder to see.

The gnomon and gnomon support of the Caius dial are seen almost edge on. The multitude of parallel lines on the dial plate are hour lines and half-hour lines. In Fig. 3 the shadow indicates a time of just after 06:30. Your Chairman is an early riser!

The Gouda dial has hour lines but no half-hour lines. The 6 o'clock hour line passes through the base of the nodus support. This is as it should be but the other hour lines do not spread out as they get further from the 6 o'clock line. The shadow of the tip of the nodus is off the edge of the dial plate but it is conceivable that it indicates 09:30 as its partner dial does. If so this is more likely to be by good fortune than by careful setting out!

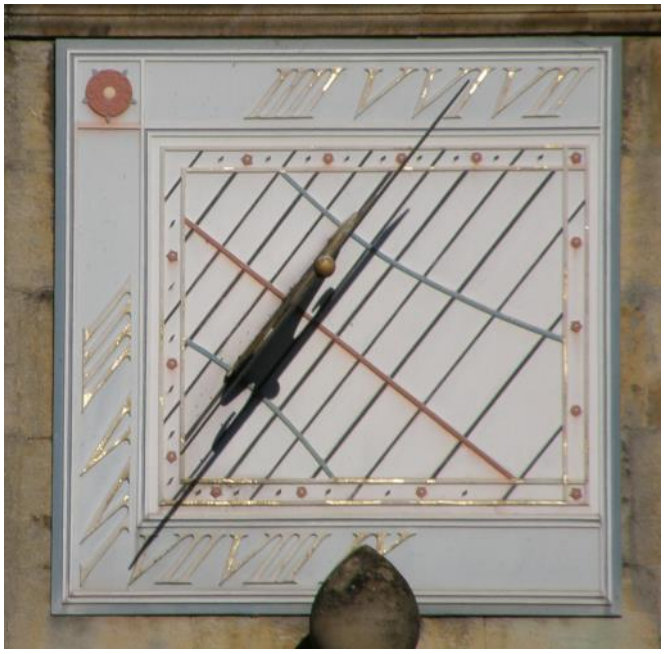


Fig. 3. The east-facing dial at Gonville and Caius College.

The reddish-tinted line on the Caius dial that crosses the hour and half-hour lines at right angles is the equinoctial line. Associated with this are the two hyperbolic arcs of the summer solstice curve (lower) and the winter solstice curve (upper). The shadow of the nodus is just discernible and indicates that the time of year is a few weeks one side or the other of the summer solstice.

It would be perfectly possible to incorporate additional constant-declination lines. They too would be hyperbolic arcs, all intersecting the 6 o'clock line at right angles.

In Fig. 2, the shadow of the nodus support falls a little above the equinoctial line; the out-of-sight shadow of the nodus is therefore indicating a time of year on the winter side of the equinoxes. Given the early-October date, this is also correct.

The lines which are parallel to the equinoctial line are very probably intended to be constant-declination lines but they should not be straight and their spacing makes no sense. It also seems that the two outermost of these lines represent declinations well outside the range ±23.44°.

In summary, the equinoctial line and the 6 o'clock hour line appear to be close to correct. They both pass through the sub-nodus point where they intersect at right angles. All the other lines on this dial are seriously suspect. John Davis surmised that the original dial was correctly set out and we are seeing a bad case of restoration drift.

He added that it was not a good design decision to have the nodus support so near the centre of the dial plate. It would have been better to have it higher up.

We cannot be sure about what went through the mind of the original designer but the sub-nodus point of the Caius dial is also around half-way up the dial plate and this design looks reasonably pleasing. Of course, having a gnomon makes a difference; we are not comparing like with like.

The shadow of the Caius gnomon will cover the full lengths of most of the hour and half-hour lines at some time of the year. That said, most of the winter solstice curve and much of the equinoctial line are rather academic!

As a footnote, there is a minor curiosity about the Caius dial. The outer ends of the hour lines are highlighted by little roses in the top and bottom margins and on the left but, strangely, not on the right! Additionally there are half-hour tick marks and quarter-hour diamonds at top, bottom and left but, on the right, nearly all are missing!

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Solution to the Crossword

The clues to the crossword, by John Lester, may be found on page 39 of the *BSS Bulletin* 28(ii) (June 2016)

F	O	S	T	E	R	■	P	A	T	I	N	A
A	■	T	■	B	■	D	■	P	■	L	■	L
C	L	I	M	A	T	E	■	H	A	I	T	I
E	■	R	■	R	■	A	■	E	■	U	■	D
T	O	R	C	■	A	N	A	L	E	M	M	A
■	■	U	■	B	■	E	■	I	■	■	■	D
R	I	P	L	E	Y	■	P	O	B	B	L	E
A	■	■	■	R	■	K	■	N	■	E	■	■
D	I	A	G	O	N	A	L	■	A	D	I	E
I	■	P	■	S	■	M	■	S	■	F	■	D
A	R	I	E	S	■	A	S	T	R	O	I	D
N	■	A	■	O	■	L	■	A	■	R	■	A
S	A	N	E	S	T	■	G	R	A	D	U	S

A SUNDIAL IN THE SAND

JACKIE JONES

When it was decided to hold the 2016 BSS Conference at Liverpool, we thought we would find out what other attractions there are in the area. One of these is the Antony Gormley artwork at Crosby Beach, about 8 miles north of the city. "Another Place" consists of 100 cast-iron life-size figures along about three kilometres of coastline, looking out to sea. Rob Stephenson, my husband, thought that one of these would be ideal to incorporate into an analemmatic sundial marked out in the sand on the beach.

These dials, often used in children's playgrounds, work by having a vertical gnomon, usually a person, standing at the appropriate place on a marked date scale. As a fixed statue, very firmly concreted into the ground, could not be moved, the dial had to be delineated around it so that it stood on the correct date mark. Being on the beach, in the sand, it was not intended to be permanent in any way.

Fig. 1. Taking a bearing to establish the north–south line.

David Brown has some experience in constructing this type of dial, and has designed a number of them, including the impressive one at the Queen Elizabeth Olympic Park installed in 2011. He came up with all the methodology for laying it out; this consisted of a number of long pieces of wood (door stop strips) with measurements marked on them, and a large set square to align them in the right positions. It was decided to construct it in the sand just below the high tide line where the sand is more damp and therefore easier to draw in. Tide times were checked and we agreed that the best day was 14 April, the day before the Conference started. Low tide was about 2 pm; this gave us from early morning until about 8 pm when it would all be washed away.

As one can never be sure the sun will shine, especially in April, we had to have a foolproof method of establishing the meridian. It didn't shine, so we had to resort to another method. Although the dial was temporary, it had to be accurately aligned. With the statues being cast-iron, a compass would have potential problems; we used a combination of a mobile satnav and a local landmark (the lighthouse at New Brighton) whose bearings from our site had been found previously using Google Earth. From that, the north–south line was established and marked in the sand (Fig. 1).

As we knew the date the dial would be in operation, we knew where the figure, which is about 6 feet tall, would need to stand in relation to the centre of the dial. We marked that distance to the south of the figure. The dial measurements were based on a 3 metre semi-major axis, giving an overall dial size of 6 metres by about 4 metres. It was designed to read British Summer Time, adjusted for longitude. Under David's direction, we proceeded to mark out the rest of the dial (Fig. 2).

Fig. 2. Marking out the dial in the sand.

For each hour marker, we used a number printed onto paper and stuck onto a plastic backing board; these markers were later replaced by driftwood sticks so as not to leave any polluting refuse (Fig. 3). The date scale was drawn in the sand around the statue's feet and on the north–south line

Fig. 3. Establishing the position of the hour markers.

Fig. 4. The date scale on the north–south line.

(Fig. 4). Markers were also placed so the times of sunrise and sunset could be known. The area was then swept with a yard broom to remove the footprints and the dial was complete (Fig. 5).

Earlier that morning, Mike Shaw had been on the local radio talking about sundials[1] and the BSS Conference taking place in the city; he also mentioned the exercise on Crosby Beach. Possibly as a result of this, the dial attracted a good deal of passing interest (Fig. 6).

Fig. 6. Passers-by watching us construct the dial.

Fig. 5. The finished dial.

A coach party of art enthusiasts who had come to look at the Gormley statues wanted to know more about dials and were intrigued by our project. Every dog-walker stopped to ask what we were doing; they all received a short introduction to the workings of sundials. A teacher in a local primary school now has all the information she needs to construct one in her school's playground. The local BBC asked for photographs to show on the news later that day. Although a temporary dial, it now lives on in a photographic record on the BSS website.[2]

Fig. 7. The team with the completed dial.
Photo: Doug Bateman.

REFERENCES

1. Mike Shaw's radio interview: *http://sundialsoc.org.uk/news/2016-conference-mike-shaw-on-radio-merseyside/*
2. The photographic record of the construction of the dial. Photographs by Jackie Jones and Doug Bateman. *http://sundialsoc.org.uk/news/conference-2015-analemmatic-dial-on-crosby-beach/*

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STUDY TRIP TO POLAND

Bohumil Landsman

The sundials working group of the Astronomical Society in Hradec Králové (Czech Republic) organized a short study trip to Poland from 10 to 12 June 2016 with, of course, special emphasis on seeing sundials.

The first stop was the Muzeum im. Przypkowskich (the world-famous museum that began as the clock collection of the Przypkowski family). It is situated in the square in the town of Jędrzejów. As well as portable sundials, the museum guide showed us interesting devices for the construction of sundials and then various sundials in the museum, as well as several old books on astronomy and gnomonics.

We also visited the Planetarium and Observatory of Youth in Niepołomice. Interestingly, there were, among other things, programmes for blind people. Blind people perceive the spoken word more intensely. The programme for them is mainly based on information reported in speech communication.

Another interesting stop was the Silesian Planetarium and Astronomical Observatory of Nicolaus Copernicus in Chorzów. In the courtyard of the planetarium there is a large sundial showing local solar time, and in the basement we found a seismological station containing two early 20th-century seismographs as well as their more modern equivalents. A meteorological station forms part of the same complex of buildings.

As an additional diversion, we also visited the salt mines in Wieliczka.

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Beauty can be Timeless

The late Margaret Ribchester, whose obituary appears on page 10, submitted this photograph as one of her entries for the 2016 BSS Photographic Competition. For the caption, she offered “Beauty can be Timeless”.

The BSS Registrar, John Foad, notes that this dial, SRN 0194, is at Sizergh Castle, a National Trust property a couple of miles south of Keswick. It is at the south-east corner of the building, on the balcony at the top of steps that lead down to a croquet lawn. He adds that this 18th-century dial is worth a visit for the setting alone. This explains the “Beauty”. The apparent lack of hour lines may explain the “Timeless”.

John further notes that this sundial was first reported in 1990 by Robert Sylvester who observed that the gnomon was a replacement.

FHK

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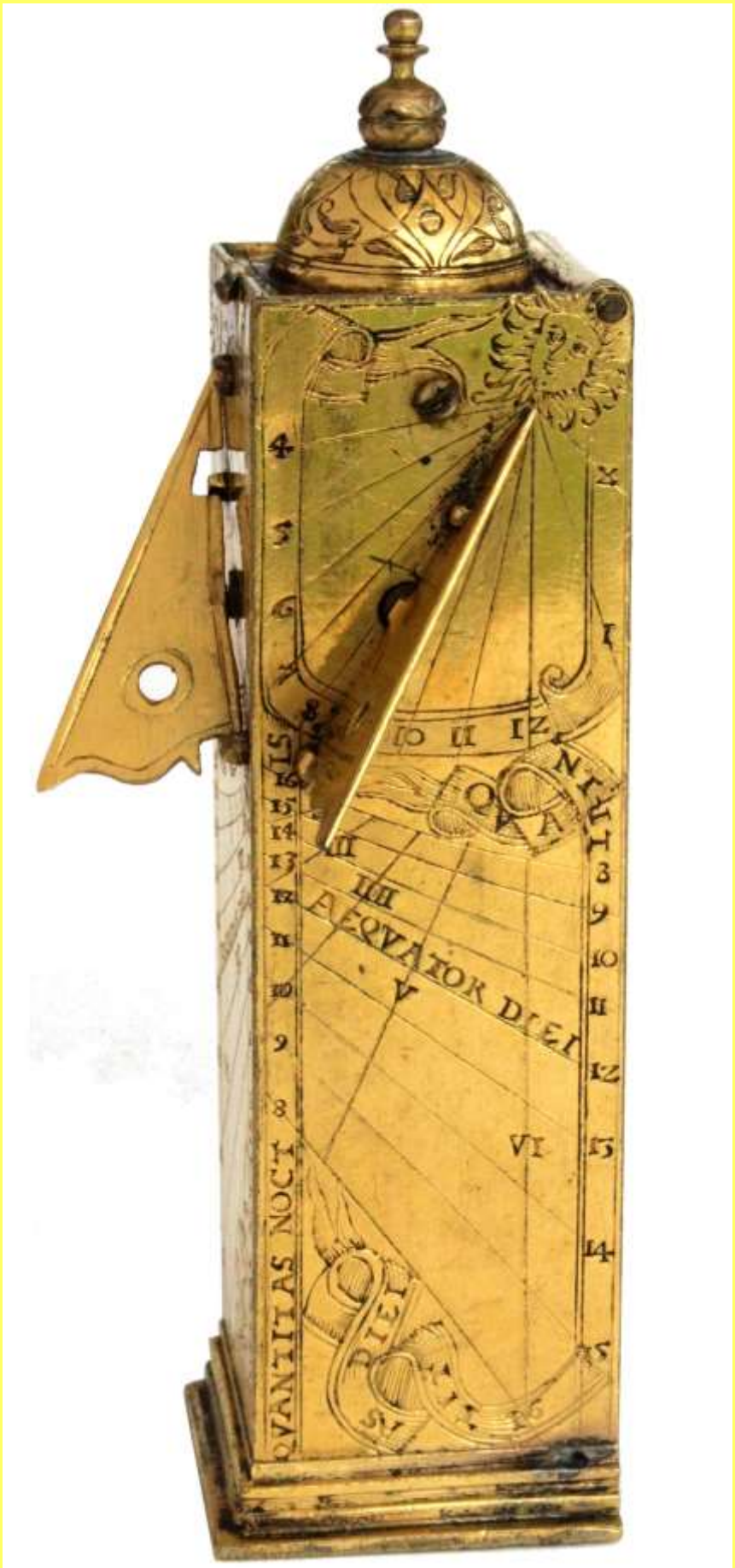
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