

SAMUEL SAUNDERS

A Study of a London Sundial Maker - Part 1

MACIEJ LOSE

The original intention of this article was to cover the story of two restorations of an early 18th-century London-made horizontal garden sundial by Samuel Saunders. The sundial came into my hands with a broken gnomon but the extent of the damage was hidden behind a very intriguing, early restoration, performed with brass bars bolted to both sides of the gnomon. Due to technical problems that arose during the restoration, its process was prolonged. At some point there was a serious risk that we would fail to restore it properly. Luckily, the obstacles were overcome and the final result turned out satisfactorily making the restoration story and the restored sundial look an interesting topic, worth sharing with *Bulletin* readers. (The dial can be seen below in Figs 3 and 5.)

As part of the article describing the renovation process, I started to collect some basic information on the maker. I found in the Webster's database¹ that there were not one, not two, but three instrument makers named Samuel Saunders, all active in London in the first half of the 18th century!

As various databases gave contradictory attributions of Samuel Saunders' signed gnomonic instruments, the primary task was to find out who made the discussed sundial, and possibly establish correct makers for the other Saunders' instruments. These questions absorbed me and quickly developed into an amateur investigation on preserved works of the three London instrument makers – which I shall discuss in this article instead of original intention of focusing on sundial's restoration which will be the subject of a future article.

The available sources provided some basic biographical records and showed that there was no direct family, guild nor master-apprentice relationships between the three makers:

Samuel Saunders I

- apprenticed to Jonathan Roberts in the Broderers' Company – 1699,
- turned over to John England in the Stationers' Company – 1703,
- freed by patrimony in the Masons' Company – 1708; died 1743.

Samuel Saunders II²

- apprenticed to William Coleman³ – 1736/7,
- freed in the Goldsmiths' Company – 1759'
- Master Compass Maker to the Admiralty at London's Deptford Dock 1756 – 1782, died 1783.

Samuel Saunders III²

- apprenticed to Joseph South in the Clockmakers' Company – 1723,
- freed in the Company – 1730.

Instruments Survey Methodology

In the case of the three non-related instrument makers with identical names – as we have seemingly here – the simple method for attribution of an instrument to a specific maker must be based on comparative analysis of characteristic elements of the signature (summarized later in Fig. 9) and style of engraving, with help from other information, derived from the instrument or historic facts.

Such methods of maker's identification would fail when applied to family generations of instrument makers such as Cole, Adams or Dollond, who visibly passed their craftsman style from one generation to the other, and often signed instruments in a similar manner – making it impossible to distinguish the actual maker.

In the case of Saunders' instruments, the method worked out well and allowed attribution of all the instruments bearing Saunders' signature for which any iconographic material could be found.

I was able to identify total of 13 instruments that bear signature of S. Saunders. Gnomonic instruments prevail with four horizontal dials, one Butterfield dial, three equinoctial ring dials and a plane table with azimuth dial. Others include: two sets of drawing instruments, a circumferentor, a sector and a compass. Instruments were coded according to the first column of Table 1, which also summarizes the conclusions of the following sections in which individual instruments are discussed in detail and are compared with others.

As the horizontal sundial with broken gnomon (coded as HD2) was the starting point for the survey, it serves as a main reference instrument.

The four horizontal dials covered by the survey represent three sundial types crafted by top London instrument makers; one being a unique overseas, royal commission (HD3), two representing English nobility custom orders characterised by their abundant furniture (HD1, HD4); and the last being a standard, though fine and elaborate dial with an EoT scale (HD2).

Erddig Hall Horizontal Dial (HD1)

The Erddig Hall (NT) sundial (HD1, Fig. 1) is the only Saunders dial recorded in the *BSS Register of Fixed Dials*.

Instruments attributed to Samuel Saunders I					
Instruments most likely made by Samuel Saunders I					
Instruments most likely made by Samuel Saunders II					
Text Code	Instrument type	Location	Signature type	Signature common features	Notes
HD1	Horizontal garden dial	Erddig Hall, Clwyd, Wales	S. Saunders Fecit	weathered	ca. 1725-1732, for lat. 53° 01', repaired plinth, octagonal dim. 36.2cm a.f., 1' time scale, EoT, 8 point compass rose, cities noon ring, gnomon's scrollwork identical to HD2
HD2	Horizontal garden dial	Private collection, Nicholson auction, 2010	Samuell Saunders Londini Fecit	double "II", ".S"	octagonal, for lat. 52°, dim. 35.7cm across flats, 1' time scale, EoT, 16 point compass rose, 2x repaired gnomon. Reference instrument
HD3	Horizontal garden dial	Courtyard of Royal Palace of La Granja de San Ildefonso, Segovia, Spain	Sam ^{II} . Saunders LONDINI Fecit	".S" double "II"	ca. 1721-1743, engr. lat. 40° 50', circular, 1' time scale, EoT, 32 point compass rose, engraving style similar to HD2
HD4	Horizontal garden dial	Sotheby's auction, 1998, Dreweatts, 1999	S. Saunders Londini Fecit	?	No pictures. Circular 38cm, 1' time scale, EoT, cities noon ring, 16 pt compass rose, coat of arms, later gnomon - furniture similar to HD1
BD	Butterfield dial	Private collection	S. Saunders Londini Fecit	".S"	Oval dial 9.5cm x 7.2cm, mahogany box, style of engraving of some arabic numerals similar to HD2, , <i>fleur-de-lys</i> like on: RD1, PT
RD1	Equinoctial ring dial	Nordiska Museum, Stockholm, Sweden	S. Saunders Londini Fecit	".S"	Diam. 16cm, bridge for Julian calendar (pre -1752). Inv. No. NM.0151465, style of engraving Arabic numerals identical to HD2, <i>fleur-de-lys</i> like on BD,
RD2	Equinoctial ring dial	National Museum of Scotland, Edinburgh	S. Saunders London Fecit	".S", "t."	Diam. 12.5cm, bridge for Julian calendar (pre -1752), Inv. No. NMS.T.1875.27.3, style of engraving Arabic similar to BD
RD3	Equinoctial ring dial	Private collection, Christie's London, 1994	S. Saunders Londini Fecit	?	No pictures. Diam. 15.25cm, incomplete: dial lacks bridge
PT	Plane table	Chinese Palace Museum, Beijing	S. Saunders LONDINI Fecit	".S", "t."	Dim. 43.2 x 35.5, on tripod stand, style of engraving arabic numerals identical to HD2, <i>fleur-de-lys</i> as BD,
CF	Circumferentor	Private collection, Bonhams auction, 2009	S. Saunders Fecit	".S", "t."	Incomplete: base only, style of engraving Arabic numerals identical to HD2, <i>fleur-de-lys</i> like on BD,
IS1	Instrument set	Private collection	S. Saunders Londini Fecit, S. Saunders Fecit	".S", "t."	Shagreen case,
IS2	Instrument set	Gorringes auction, 2003	S. Saunders Fecit	?	No pictures. Fishskin case
SC	Sector	Dealer offer, 1987	S. Saunders	?	No pictures, Source: Webster's Database
MC	Mariners' Compass	Auction, London, 1960	?	?	No pictures. Source: E.G.R. Taylor, Webster's Database

Table 1. Saunders' signed instruments.

It belongs to the second group – the nobility orders – and is crucial to the survey as its dating can be established quite precisely. The dial is located in Wales, within Erddig Hall's formal Dutch-style garden. The design of the garden, dated ca. 1725, is attributed to Stephen Switzer and shows the sundial positioned between garden's canal and pond.⁴ The commissioner, whose coat of arms is engraved on the dial, was John Meller, a London lawyer who had bought Erddig in 1716. Meller died in 1733 and the residence was inherited by his nephew, Simon Yorke. Until the 1770s, no major changes were made in the garden's structure – which

suggests that the dial was made in short period between 1725–1733.

The dial, besides Meller's arms, bears: the Equation of Time (EoT) in the form of a ring labelled "*Æquation of Natural Days*" and marked "*Watch Faster/ Watch Slower*", an elaborate 8-point compass rose, and a ring with noon times for various geographic locations, in the form characteristic to Broderers' Company masters, i.e. John Rowley and his apprentices. Noon times for the following locations are engraved: Rome, Cairo, Moscow, Ispaham, Surrat, Peking, Mexico, N York, Barbados, Cape Farewell, Tenariff and Dublin.

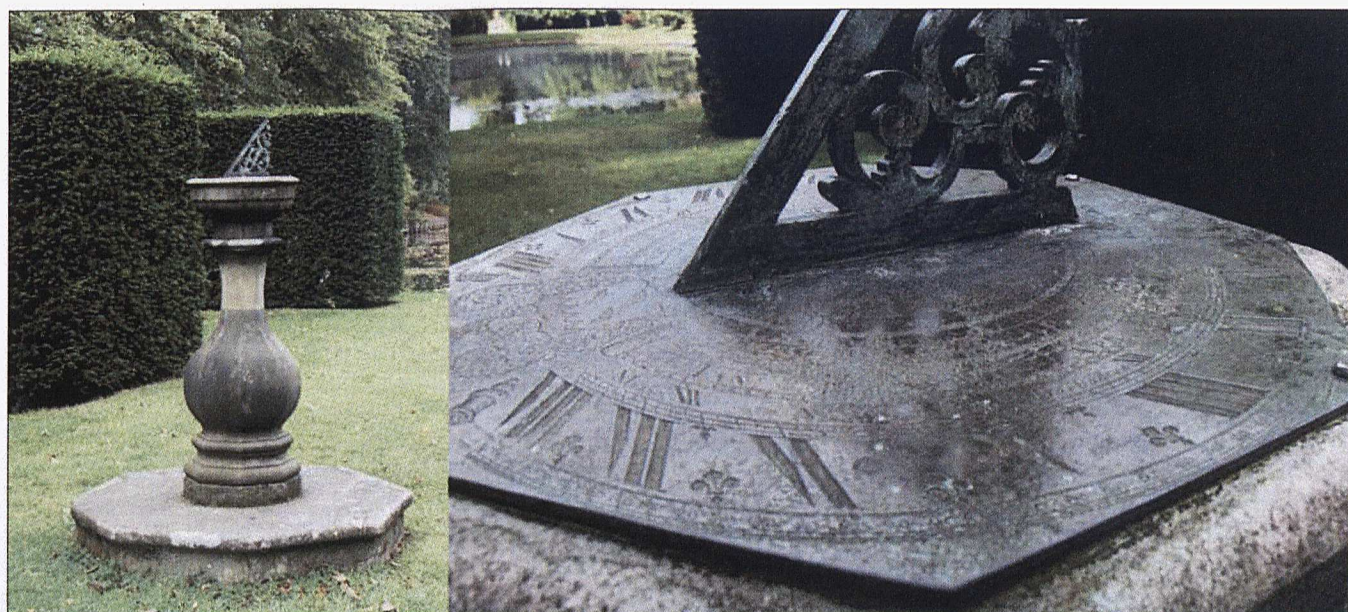


Fig. 1. Horizontal sundial at Erddig Hall, Clwyd, Wales (HD1). The light-coloured section of the pedestal is a 2000 year restoration after it was vandalised in 1999. John Meller's coat of arms are visible to the left of the right image. Photos: Keith Evans Photography, Wrexham.

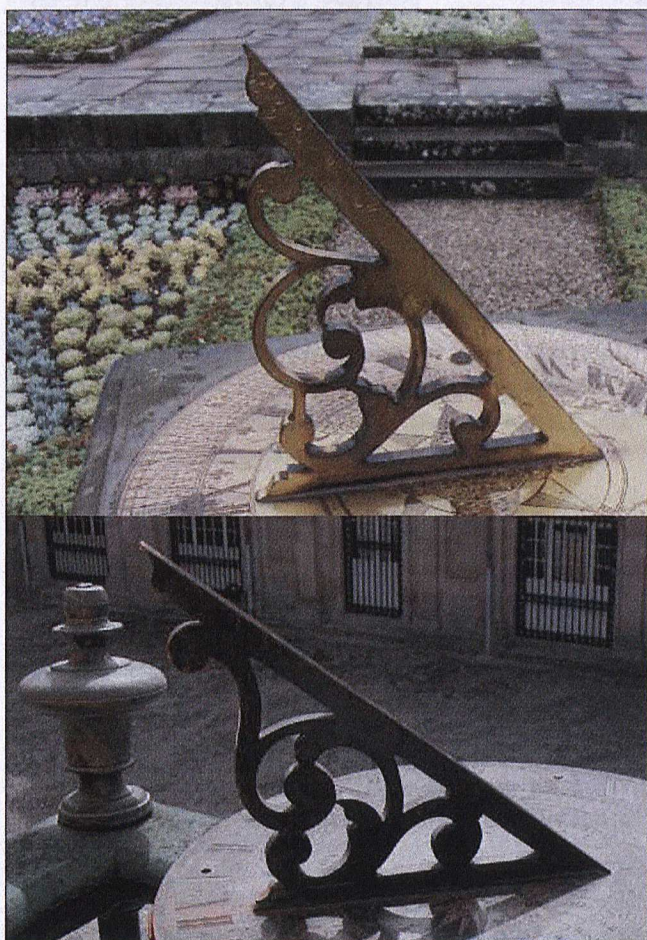


Fig. 2. Comparison of John Rowley's Hanover Berggarten sundial (1719) gnomon at the top with the one of Samuel Saunders' from the Royal Palace of La Granja de San Ildefonso, Segovia. They share a common design style and if not the 11.5° latitude difference between dials' locations, the scrollwork designs would likely be similar. Photos: Reinhold Kriegler (top) and Javier Martín-Artajo Gutiérrez (bottom).

The aesthetic attractiveness of the dial is stressed by a floral ornament of a pierced gnomon. This decorative gnomon (Fig. 3) bears similarities to those of other sundials of 1720s, but maybe the most obvious similarity is with pierced gnomon of Thomas Tompion's earlier Kew Gardens sundial, which could have been Saunders' direct inspiration.⁵ Although Erddig Hall's gnomon is more robust, it has very similar structure of floral shaped scrollwork contrasted with a characteristic horizontal bar, possibly echoing Dutch mannerism ornament.

The maker's signature "S. Saunders Fecit" is placed beneath the gnomon, in the most weathered area of the dial so unfortunately specific script features of this signature are obliterated by corrosion.

The dating of the sundial, its set of furniture and its engraving style strongly suggests that it was made by Samuel Saunders I, bound with Broderers' Company not only by his first master Jonathan Roberts but also by a trade link with John Rowley, for whom he is believed to have worked between 1702-1715,⁶ acquiring some features of his craftsmanship.

Standard Horizontal Dial (HD2)

The first glimpse of the restored gnomon of the standard horizontal dial (HD2, Fig. 5) reveals that it is very close in shape to that of Erddig Hall dial (HD1) – strong evidence that it came from this same workshop. There are minor differences between the profiles of the gnomon foot and the style, as well as in details of the scrollwork decoration, but overall the look is the same.

Both sides of the gnomon have an engraving of soft, curved lines following the main floral theme – the feature that is present Tompion's Kew Gardens dial, but is absent on the Erddig Hall dial.

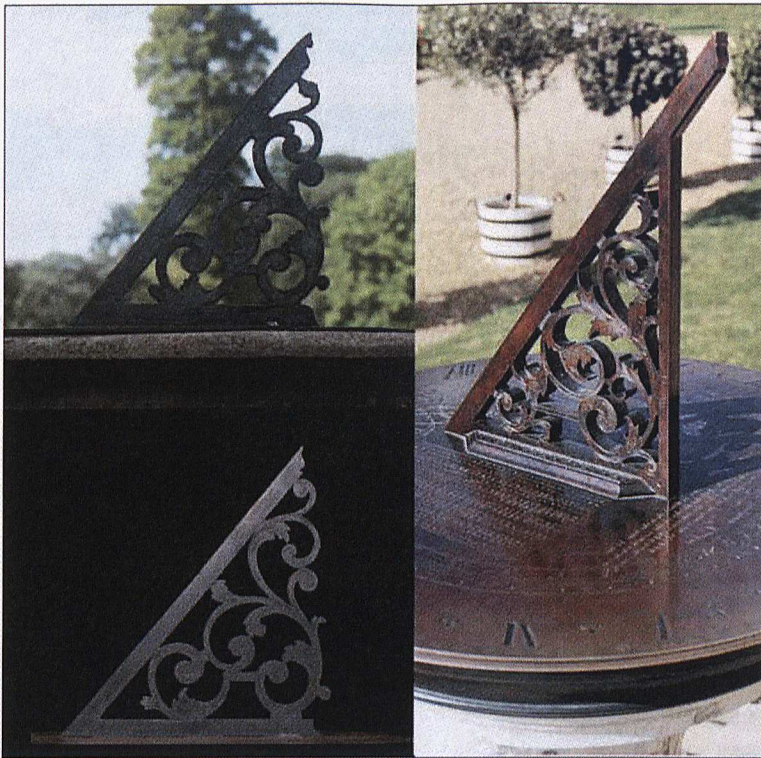


Fig. 3. Comparison of the Errdig Hall gnomon (HD1, left) and that of the standard horizontal sundial (HD2, bottom) and Tompion's Kew Gardens dial (right, image mirrored), believed to be the model for both. The gnomons of HD1 and HD2 are almost alike, with the Errdig Hall's scrollwork having slightly more simplified appendices and without side engraving. It can be noticed that some of the scrollwork differences along HD1 gnomon's style result from the latitude difference of ca. 1° between two sundials. HD2's scrollwork fits perfectly between the gnomon's style and foot bars, while in HD1 it looks as though the existing pattern had been adjusted with some modifications to the slightly higher latitude. This supports, text discussed, arguments on the precedence of the HD2 dial. The author encourages readers to enjoy playing 'find differences' game with the two images.

Photos: Keith Evans Photography, Wrexham (top), Maciek Lose (bottom) and Thom Watson (right).

Fig. 4 (below). Horizontal sundial (HD3) from the Royal Palace of La Granja de San Ildefonso near Segovia, Spain. Photos courtesy of Javier Martín-Artajo Gutiérrez.

The dial is of the same octagonal shape and a similar size, with furniture limited to EoT ring, chapter ring with 1 minute intervals and elaborated 16-point compass rose.

The measured latitude from the hour lines gives average value of 52° which matches well with the gnomon angle.

The EoT is labelled "THE INEQUALITY OF NATURAL DAYS" which is a very early 18th-century form, and possibly in most essential way describes the Equation's logic. The form used, together with the inward facing labelling of the compass rose directions – which in case of Rowley characterizes period around 1710 – implies that the HD2 dial should be dated earlier than the Errdig Hall dial.

The engraved EoT maxima and minima values are: 31 January – 14m 48s; 4 May – 4m 13s; 16 July – 5m 46s and 23 October – 16m 0s which match well with values from tables calculated by Flamsteed (1702) and reprinted by Smart (1710),⁷ with only 1 second difference in the January maximum and the October minimum.

Within the maker's signature: "Samuell Saunders Londini Fecit" - the double "ll" and "Londini Fecit" spellings should be noted – a characteristic element to early 18th-century London makers, and typical for the Broderers' Company circle.

Having direct access to the dial allowed also for a more detailed study of the engraving style – in particular the font of the numerals and the contour of the *fleur-de-lys*. Particular digits should be noted: '8' composed of two flattened ovals; '4' with a distinctive serif at the end of the horizontal stroke; '2' with an inward swirl of the instroke. Compared to other sundials of the period, the numerals, both Roman and Arabic, are of a little larger size, possibly to optimize their legibility.



Segovian Horizontal Dial (HD3)

The third horizontal sundial (Fig. 4) is a true dialling masterpiece and is preserved in perfect condition in its original location, the courtyard of the Royal Palace of La Granja de San Ildefonso, near Segovia, former summer residence of

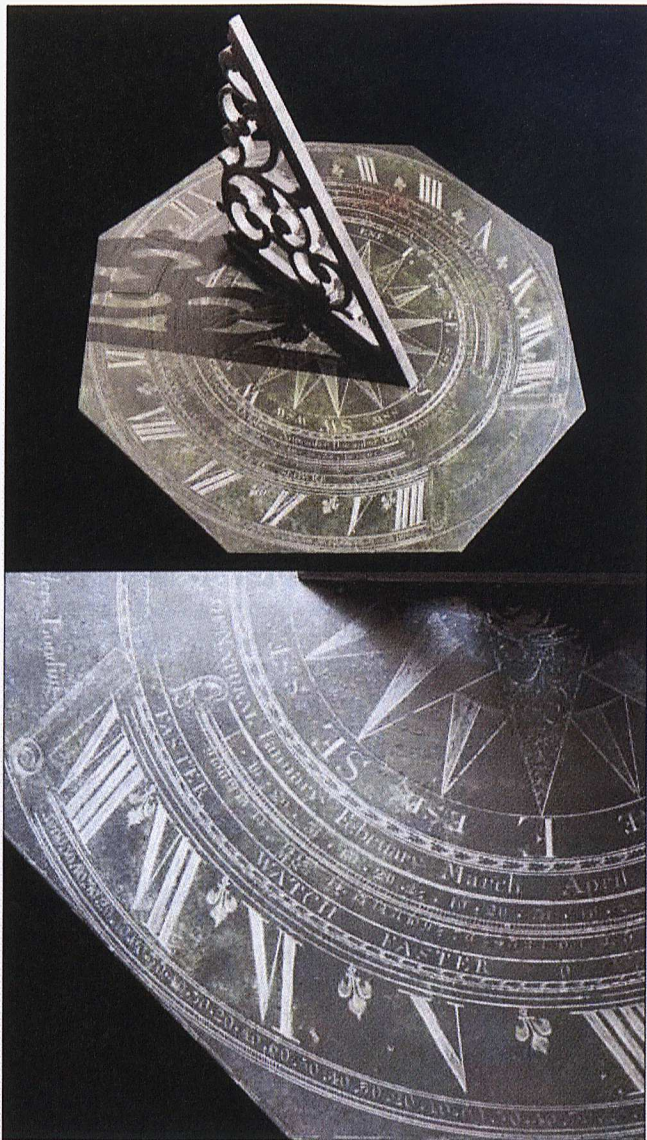


Fig. 5. Standard horizontal sundial (HD2). The Arabic numerals are typical of Saunder's style on all his instruments and larger than on most instruments of the period.

the Kings of Spain. This magnificent palace and gardens complex, commissioned by King Philip V and modelled after Versailles, was built starting from 1721.⁸

The complex was completed before King's death in 1746 and since no major changes were introduced after his passing, the period 1721–46 marks the most probable date for the dial.

Though the dial's furniture does not include a geographic ring, a feature present on the English nobility dials HD1 and HD4, its abundant floral decoration and precise, excellent engraving entirely compensates for its absence.

The elegant, scrolled gnomon is of a more lightweight design than its Erddig Hall and Standard dial counterparts (HD1 & HD2 respectively). It resembles very closely that of John Rowley's 1719 sundial for Hanover's Berggarten (Fig. 2). In fact, if it were not for the 11.5° latitude difference between the locations, which influences the design of the scrollwork in its upper section, the gnomons would have been identical.

The maker's signature, "Sam^l. Saunders LONDINI Fecit", engraved within a cartouche, has a form similar to the Standard horizontal dial (HD2) in respect to the double letters 'll' in the abbreviated form of maker's name and "Londini Fecit" form. Abbreviated names are usual on English dials of the period, with common examples such as 'Tho^s' for Thomas or 'Jⁿ' for John.

The 'S' letters include decorative serifs, a feature which is typical for all portable instruments created by Samuel Saunders I.

The overall composition of the signature cartouche is again quite similar to the one used by Rowley in Hanover.

The numeral form and rich palette of various *fleur-de-lys* marks used on the dial match those present on the HD2 standard dial, including: 5-min interval marks in the outer time chapter ring, large classical *fleur-de-lys* marks, oversized numerals and their individual features.

The Equation of Time values are engraved for Gregorian calendar dates, not unusual as the Georgian calendar was adopted in Catholic Spain in 1582, almost two hundred years before England. The maxima and minima values are marked in the same manner as on the HD2 Standard dial, with the values differing by 1 second in May (4m 12s) and February (14m 49s), and the same October/November value of 16m. The July maximum value unfortunately could not be read from the available images of the dial. The three values match EoT values from the 1733 table used by a London clockmaker George Neale,⁷ which itself probably bases on revised Flamsteed/Smart calculations.

HD4 Horizontal Sundial

No image documentation of the fourth and last identified Saunder's horizontal dial was found. It is known only from its description found in the Sotheby's (1998) and Dreweatts (1999) auction catalogues. The dial is of a circular shape, 38 cm in diameter, with 1-minute divisions of the time ring and it includes abundant furniture, common with the Erddig Hall dial (HD1) pattern: EoT, 'geographic' noon times ring, 16-point compass rose and coat of arms. The sundial is signed "S. Saunders Londini Fecit".

Based on the above, one can assume with great certainty that the dial was made by Samuel Saunders I.

The catalogue description of the dial notes that the gnomon is of a later provenance. Based on overall similarities to the Erddig Hall dial (HD1) and known details and commonality of the Erddig Hall and Standard dial (HD2) gnomons, one can easily imagine what the lost, original gnomon looked like. If the dial's owner is among the readers, please feel free to make contact and have it reconstructed along Saunders' original ideas!

To be continued

REFERENCES AND NOTES

1. The database of instrument makers compiled by the late Rodney and Margery Webster is now on the Adler Planetarium

- website at historydb.adlerplanetarium.org/signatures/
2. Samuel Saunders II was ascribed this number to match with the existing entries in Gloria Clifton's *Directory of British Scientific Instrument Makers 1550 – 1851*, Zwemmer, London, (1995) and J. Wilson: *Biographical Index of British Sundial Makers from the Seventh Century to 1920*, 2nd edition. BSS monograph No. 2. (2007). Consequently the Samuel Saunders III of the Clockmaker's Company is given his III number, which is not in chronological order in relation to Saunders II. Clifton's *Directory* and the BSS *Biographical Index* do not include any information on Samuel Saunders III, who in the Websters' database is labelled as Saunders II.
 3. According the BSS *Biographical Index*, Samuel Saunders' II master was William Coleman, while Gloria Clifton's *Directory* names William Collier.
 4. Design for a formal garden at Erddig, c. 1725, attributed to Stephen Switzer: The National Trust (Yorke Collection), on loan to Clwyd Record Office.
 5. The rare Tompion signed sundials, based on their similarity to John Rowley's craftsmanship, are suggested by John Davis to have been subcontracted to Rowley. In light of this, all the gnomons of discussed horizontal dials would be based on Rowley's works. For another view of the replica of the Kew Garden's Tompion sundial see back cover of *Bull. BSS* 23(iii), (2011).
 6. M. Cowham: 'Dial Dealings 2009', *Bull. BSS* 22(i), 31 (2010).

7. J. Davis: 'The Equation of Time as shown on sundials', *Bull. BSS* 16(iv), 138 (2003).
8. en.wikipedia.org/wiki/Royal_Palace_of_La_Granja_de_San_Ildefonso
9. A photograph of Saunders' instrument set (IS1), can be viewed at the EAHN exhibition review page: eahn.org/site/en/compassandrule.php
10. E.G.R. Taylor: *The Mathematical Practitioners of Hannoverian England 1714-1840*, 217, CUP (1966).
11. M.A. Crawford: 'Instrument makers in the London guilds', *Annals of Science*, 44: 4, 319-377 (1987).
12. John England's equinoctial dial in the Oxford MHS collection, Inv. No. 35162, can be viewed at: mhs.ox.ac.uk/collections/search/. For Whipple Museum instruments see: J. Davis: 'Sundials at Trinity College Cambridge', *Bull. BSS*, 16(i), p.7 (2004).



Maciek Lose is an architect and astronomy enthusiast. He runs an architectural practice *FORUM Architekci* in Wrocław, Poland, focused on the design of public buildings. He has been interested in gnomonics since the first Polish nationwide survey of sundials in 1995. He can be contacted at mlose@interia.pl