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Volume 37, No. 4 (December 2016) contains, apart from the regular sections Book Reviews, Picture Gallery, AHS Programme, AHS News, Letters to the Editor and Further Reading, the following articles

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Front cover: Detail of a pearl, gold and enamel automaton mouse, attributed to Henri Maillardet, circa 1805. The automaton is illustrated inside the issue in the announcement of the AHS London Lecture to be given in March 2017 by Julia Clarke on 'Casing watches and automata. The goldsmiths and enamellers of Geneva 1780–1830'.

The origin of the English lantern clock

Part 1: Comparison with European Gothic clocks

John A. Robey*

English lantern clocks are often said to be a development of the iron Gothic clock, made on the Continent from the fifteenth century, and while this has been refuted on stylistic (but not technical) grounds, it is still popularly believed. This article discusses the two main types of Gothic clocks: Germanic and French/Flemish, noting their similarities and differences, and compares them with the earliest lantern clocks. Apart from the basic concept of a posted-frame weight-driven wall clock with end-to-end trains, it is shown that there are very few similarities between lantern clocks and Gothic clocks. They differ not only in style but in their materials, construction and many technical details.

Introduction

The origin of the lantern clock, which is primarily an English concept, has not been seriously discussed in the literature. Two general statements have been made about the lantern clock. Firstly, that it was derived from the Continental iron Gothic clock, and this has been repeated so often that it is still widely accepted, without question, as being correct. Typical statements by eminent horologists include:

- ‘It is however, obvious that it is closely related to the Gothic wall clock, civilised and compressed and encased with brass walls and doors’¹
- ‘... the line of descent should be traced between the true lantern clock and the most common type of hanging-weight clock made in the latter part of the previous century. The construction of these “posted” or

“framed” iron clocks was in turn derived from the “Gothic clocks” of the fifteenth century which were shorn of their elaborately shaped and pierced framing, crockets, spires, pinnacles and other decorative features ...’²

- ‘... late 16th century South German wall clocks which should be considered the forerunners of the lantern clock’³
- ‘The first such clocks were somewhat shorter than the Gothic clocks from which they derived ...’⁴
- ‘The lantern clock appears to have been a simplified version of the Gothic iron clock, made to reduce costs and expand the market for clocks’⁵
- ‘Lantern clock design appears to have derived from the weight-driven iron, or so-called Gothic clocks, which were made on the Continent’⁶

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1. Cecil Clutton, G. H. Baillie & C. A. Ilbert, *Britten’s Old Clocks & Watches* (9th edition, 1982, revised and enlarged by Cecil Clutton), p. 24. This statement appears in the 7th edition (1973), but not in the 6th edition (1932) or earlier.

2. Anthony Bird, *English House Clocks 1600–1850* (Newton Abbot, 1973), p. 59.

3. W. F. J. Hana, *Lantern Clocks* (Poole, 1979), p. 17.

4. Cedric Jagger, *The World’s Great Clocks & Watches* (1977), p. 98.

5. Eric Bruton, *The History of Clocks and Watches* (1979, reprinted 1989), p. 68.

However, George White has stated that ‘the old theory that only London weight driven clocks of the late Elizabethan and early Jacobean period were made to a bastard Gothic or “transitional” design can be rejected out of hand’.⁷ Despite this statement the connection between the lantern clock and the Gothic clock has been promoted in more recent publications:

- ‘the lantern clock, a brass posted-frame clock which was a development of continental clocks.’⁸
- ‘Lantern clocks ... were derived from the continental Gothic type and were called “brass clock” to distinguish them from the iron wall clocks that came mainly from southern Germany and Switzerland ...’⁹
- ‘The English lantern clock ... was a direct development of the iron clocks generally called ‘Gothic’ clocks ...’¹⁰
- ‘It comes as no surprise therefore that a style of clock should develop in England which had its origins in the iron chamber clock ...’¹¹

and in my experience this view is still widely held by many non-specialist horologists.

George White has shown that Classical and Renaissance design and architecture had largely superseded the Gothic before the advent of the lantern clock, but he does not compare and contrast the technical features of the two types of clock.¹² Likewise, Darken & Hooper state (and other authors imply) that the development of the lantern clock was merely one of modernising its style and appearance:

At the start of the seventeenth century therefore, the essential elements of clock mechanisms had become well tried and tested over the previous two hundred years



Fig. 1. Hour-striking clock with alarm by Erhard Liechti, Winterthur, Switzerland, 1584. Dial new, the flowers on the bell frame and possibly the balance are restorations. (Deutsches Uhrenmuseum, Furtwangen, Inv. 3-0581).

and little need was envisaged to improve upon them. For house clocks, in the absence of technical progress, what emerged now was a matter of style and decoration.¹³

6. Percy G. Dawson, C. B. Drover & D. W. Parkes, *Early English Clocks* (Woodbridge, 1982, reprinted 1994), p. 57.

7. George White, *English Lantern Clocks* (Woodbridge, 1989), p. 55.

8. Jeff Darken & John Hooper, *English 30 Hour Clocks* (Woking, 1997), p. 15.

9. H. M. Vehmeyer, *Clocks Their Origin and Development 1320–1880* (Gent, 2004), p. 492.

10. W. F. Bruce, *Early English Lantern Clocks 1615–1700* (Lewes, 2004), p. 7.

11. David Thompson, *Clocks* (British Museum, 2004), p. 62.

12. White, *English Lantern Clocks*, pp. 42ff.

13. Darken & Hooper, *English 30 Hour Clocks*, p. 15.



Fig. 2. Quarter-striking Gothic clock by Erhard Liechti, Winterthur, dated 1572, with moon phase and alarm (alarm mechanism missing). Painting restored and balance possibly replaced.



Fig. 3. Highly decorative bell frame and hammers of the Liechti clock. Largely original with just two pinnacles replaced.

Fig. 4. Left-hand side of the movement with prick-punched decoration on the upper part of the frame and signed '15 E*L 72' on the lower. Note the hammer spring below the frame, internal teeth on the countwheel, lever for lifting the balance and the external fly (restored).



(Kellenberger Clock Collection, photos: Michi Lio).

It is the purpose of this article to determine whether the English lantern clock was simply a revamp of the Continental iron clock's style and appearance, or was there a more radical improvement in design, materials and construction?

Secondly, 'It is said that the lantern clock has no ancestry but appeared fully matured. ... it is indeed remarkable that so few transitional pieces remain',¹⁴ and more recently: 'The way that these clocks seem to arrive at the very beginning of the seventeenth century, fully developed in their decorative treatment as well as their technical construction, is extraordinary.'¹⁵ White and Loomes¹⁶ discuss possible prototype or transitional clocks and the validity of the various claims for a 'pre-lantern' English clock is also considered in Part 2 of this article. Since lantern clocks were the first domestic clocks of indisputable English make and were virtually the only ones constructed in this country until the development of the pendulum in 1658 and its subsequent use in longcase and spring-driven bracket clocks, these statements deserve further investigation to judge their validity. The first claim is discussed here in Part 1, while the second is considered in Part 2 of this article.

To understand the lantern clock it is necessary to consider what went before. We need to compare the design and technical features of the earliest English lantern clocks, which first appeared about 1600 (see Part 2), with Gothic clocks of a similar period. However, there are several things that need to be borne in mind. Some authors have classified almost all early iron clocks as 'Gothic' whereas the term should be restricted to those similar to Figs 1, 2, 5–7, having buttressed corner pillars set at 45 degrees to the frame, together with ornaments on the bell frame, all based on the designs of Gothic architecture. It is often not appreciated that there are two distinct 'schools' of Gothic clocks: Germanic (Figs 1–4) — including the German-speaking regions of northern Switzerland and the Austrian Tyrol that border southern Germany — and Flemish/



Fig. 5. Sixteenth-century French or Flemish Gothic clock with a Gothic bell, a central gathered countwheel and warned striking. The complete escapement and probably the foliot are replacements. (Science Museum/ Science & Society Picture Library, Inv. 1954-184).

French (Figs 4–9). Italian Gothic clocks can be considered as being broadly similar to Germanic ones with minor differences.

Like most later Continental iron clocks, Gothic clocks rarely include the clockmaker's name, place of work or a date, so that apart from distinguishing Germanic from Flemish clocks, their origin and date (often optimistically dated too early) are largely based on guesswork rather than firm evidence. The exceptions are those made by the Liechti

14. Clutton, et al, *Britten's Old Clocks*, p. 24.

15. W. F. Bruce, *Early English Lantern Clocks 1600–1700*, (Lewes, 2013), p. 52.

16. Brian Loomes, *Lantern Clocks & Their Makers* (Mayfield, 2008), pp. 7ff.

family of Winterthur, Switzerland, who initialled and dated their movements (Fig. 4). Liechti clocks are some of the finest Gothic clocks that were ever made but are not necessarily typical. Furthermore, researchers have to be aware that very few completely original Gothic clocks exist, even in major museums or important collections. Many have been transformed from a rusty frame and wheels with a later anchor escapement to an almost new artefact, often with a replaced dial, balance, escapement, bell, bell-frame and hand. In addition, many of these clocks, including those in London museums, have been incorrectly restored with a bar balance (foliot) rather than a circular balance, giving a misleading impression of their original state. Also modern fakes have to be recognised. The author has, wherever possible, taken these factors into consideration during this investigation.

German and Flemish Gothic clocks compared

While all Gothic clocks have end-to-end going and striking trains, there are a few major differences between those made in the two main regions and some minor ones. In general there is a greater technical diversity with Flemish Gothic clocks than Germanic ones and any exceptions to these observations are more likely to occur in those made in the western tradition.

Germanic clocks (Fig. 1) have top and bottom sub-frames in the form of square rings linked by corner pillars, while Flemish clocks have a top plate (Fig. 6) and sometimes a lower one as well, though a lower sub-frame is more usual. Often these 'plates' are in the form of an open flat frame (Figs 5 and 9). The dials of Germanic clocks extend above and below the sub-frames but on Flemish clocks they stop below the top plate. Whereas Germanic clocks have the familiar arrangement of the wheels being parallel to the dial, Flemish clocks sometimes have all the train wheels at right angles to the dial (Figs 6 and 8), with the drive to the hand and countwheel by small starwheels.¹⁷ Flemish clocks occasionally have a foliot instead of a circular



Fig. 6. French or Flemish Gothic clock with a painted iron dial, transverse trains and an original balance and verge escapement, possibly pre-1500. Hand and bell missing. Very unusual pierced tracery applied to the lower sub-frame. Ring and spacers for wall hanging and hinges for side doors, now missing. Nag's head striking. (Mainfränkisches Museum Würzburg).

balance, but the caution already expressed should not be forgotten.

Whereas Germanic clocks use nag's head striking with a heart-shaped cam to provide overlift, Flemish clocks often have warned striking. Those Flemish clocks with nag's head striking usually use the hoop of the locking wheel to provide overlift or sometimes the hammer pins on the striking greatwheel. Occasionally Flemish clocks position the countwheel centrally between the two trains (Fig. 5), this being a western feature also

17. This is different to some early clocks where the hour and quarter striking trains are at right-angles to the going train, e.g. Part 2, Figs 28–29.



Fig. 7. An early French or Flemish Gothic clock, fifteenth or sixteenth century, with a brass chapter ring and alarm disc and standing on short feet. The bell frame and hand are later. (Kellenberger Clock Collection, photo: Michi Lio).

found on some early English and Dutch turret clocks, e.g. the Dover Castle clock of about 1633–40.¹⁸ Germanic clocks have a dome-shaped bell or bells or a variant, but on some



Fig. 8. Right-hand side showing the wheels at 90 degrees to the dial and the countwheel, the latter with internal notches. There is warned striking. (Kellenberger Clock Collection, photo: Michi Lio).

Flemish clocks it is shaped like a church bell.¹⁹ In addition a few Flemish clocks pivot the hammer on the bell frame where it is pulled by a wire and strikes the bell by gravity (Fig. 5), rather than the usual arrangement of an arbor pivoted between the corner pillars with a hammer spring.²⁰

The winding pulleys on Flemish clocks normally have spikes for the rope and the English style of circular spring click acting on the crossings of the greatwheels, compared to the friction V-pulleys with ratchet teeth and a

18. Science Museum, London (Inv. 1884-81). This arrangement was described in France as early as about 1380, see William Linnard, John A. Robey & Michael T. Wright, 'Ung petit traictie pour faire horoleiges: A little treatise for making clocks in the fourteenth century', *Antiquarian Horology*, Vol. 37 No. 2 (June 2016), 182–198.

19. Sometimes known as a Gothic shape. Information from Rainer Schütte, Curator of the Museum Klok & Peel, Asten, The Netherlands.

20. While a vertical hammer arbor is commonly found on later Germanic iron clocks and on many types of French clock, it was rarely used on Germanic Gothic clocks and only occasionally on Flemish Gothic clocks (see Fig. 9).

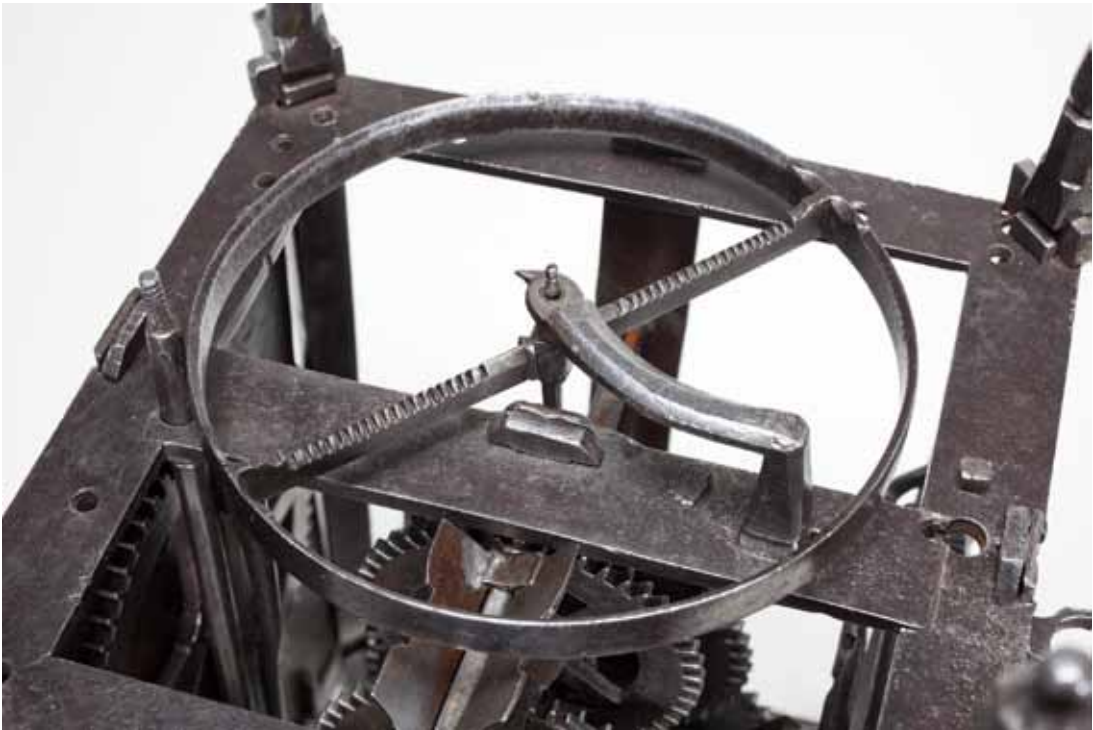


Fig. 9. The original balance is supported from below and does not hang by a cord. The spokes have notches for small regulating weights (as does the clock in Fig. 6). Note the open top plate and the vertical hammer shaft. (Kellenberger Clock Collection, photo: Michi Lio).

separate click often found on Germanic clocks. Alarms appear to be much more common on Germanic clocks than Flemish ones. There are some stylistic differences in the decoration of the bell frame — Germanic clocks often having flowers, with horses' heads on French clocks — and the 'noses' on the corner pillars, with longer feet on Germanic clocks than on Flemish clocks, as well as differences in the proportions of the frame.

Gothic clocks and lantern clocks

Since the following comparison between Gothic clocks and lantern clocks is a generalisation, and taking into account the above variations between the two schools of clockmaking, tedious repetition of 'usually', 'rarely', etc, has been avoided. Since English lantern clocks of the early decades of the seventeenth century are being compared with Gothic clocks, which had been in existence for about a century and a half before this, some inconsistencies are to be expected. What is perhaps more surprising is that, apart from a general simplification in the ornamen-

tal ironwork of the bell frame and pillars as time progressed, there was little technical advancement in Germanic Gothic clocks during the period of their manufacture.

The basic concept of lantern clocks and Gothic clocks is certainly the same: two weight-driven trains of wheels arranged end-to-end pivoted in three vertical movement bars, sitting in a square frame with corner pillars and a large bell held in a cruciform frame above the movement. If this is enough for it to be regarded as being 'closely related to' or 'derived from' the Gothic clock, then, yes one is related to the other. However, when the materials, construction and technical details are considered a significantly different picture emerges.

All of the frame, bell support, dial and wheels, including the balance, of a lantern clock are made of cast brass, compared to wrought iron on a Gothic clock. A lantern clock's only iron or steel components are the arbors and pinions, pallets, strike-work, hammer spring and stop, winding clicks, rear cover, hanging hoop and spikes. A Gothic

clock comprises two open iron sub-frames (the top one replaced by an iron plate on Flemish clocks) with the corner pillars set at 45 degrees using 'hook-on' dovetail joints, while the front and rear movement bars are held by similar dovetail joints. On Germanic clocks the frame's eleven parts are held rigidly together by just two taper pins — a wonderful feat of ingenuity that required great skill and accuracy in forging and filing the iron.²¹ The simplicity of the top plate of Flemish clocks is countered by the necessity for four extra wedges to hold it to the pillars. Gothic clocks use no screws, which first appeared about 1500 on arms and armour.²² By contrast lantern clocks have brass top and bottom plates with turned pillars, the frame secured by screw-on finials and feet.²³ A lantern clock has a total of seventeen screwed connections, including those securing the hammer spring and stop, balance cock and frets.

Gothic clocks have one-piece rectangular painted iron dials supported, on Germanic clocks, on arms riveted to the front movement bar and held by taper pins. There are no frets, side doors or back plate, and no hoop or spikes for hanging on a wall. They sat on a wall bracket and are often called *Konsoluhren* (bracket clocks), but have, of course, no similarities to the present-day concept of a spring-driven bracket clock. Sometimes Flemish Gothic clocks have a ring at the rear and spacing arms rather than spikes, but these may have been to prevent it toppling off a wall bracket rather than being its main means of support. Lantern clocks have a separate silvered brass chapter ring which overlaps the sides of the rectangular engraved brass dial sheet. An engraved cast-brass fret sits above the dial with plain ones of the same design at the sides. An iron rear cover plate and brass side doors are fitted as well as a hanging hoop and spikes. They are often signed, although several very early clocks are anonymous (Fig. 10). The brass bell strap is held on the corner



Fig. 10. A very early unsigned lantern clock with an alarm, possibly about 1610. The egg-and-dart design in the centre of the dial was also used by Robert Harvey before 1614. The front fret is a replacement copied from an original side fret. (Private collection).

finials and is surmounted by a finial of a similar design to those on the corner pillars.

21. H. G. Hammond, 'The Structural and Aesthetic Perfection of Gothic Clock Frames', *Antiquarian Horology*, Vol 10 No 3 (Summer 1977), 336–9.

22. M. T. Wright, 'The Screws in the van Call Clock', *Antiquarian Horology*, Vol. 33, No. 6 (December 2012), 762–774 (p. 764).

23. A few early London lantern clocks have pillars with integral finials and feet, while this was a regular feature of lantern clocks from the Bristol area, see: Loomes, *Lantern Clocks and their Makers*, pp. 25, 59, 164ff, 429–31.



Fig. 11. Typical lantern clock construction with cast brass pillars, feet and finials. The iron plates are unusual. The cruciform front and rear movement bars are characteristically English, as are the vertical hammer spring and L-shaped stop. Originally with a balance, later converted to anchor escapement and long pendulum. (Private collection).

All the wheels of Gothic clocks are of forged iron with separate spokes (crossings) and rim (also known as the band), fitted to arbors that pivot directly in the iron movement bars (any brass bushes are later restorations), whereas the wheels of lantern clocks are filed from one-piece brass castings. The train wheels and pinions of Gothic clocks are positioned away from the ends of their arbors, while they are almost at the ends of the arbors on lantern clocks.

There are also variations in the winding

arrangements. Germanic Gothic clocks have V-profile pulleys with serrated surfaces that grip hard ropes by friction. Ratchet teeth are filed into the rims of the pulleys with clicks on the greatwheels, or sometimes four ratchet teeth are formed on the arbor with a click and spring on the pulley. Lantern clocks use a soft rope and spiked pulleys, with circular spring clicks that engage with the crossings. This type of brutal click, which can cause considerable wear to the crossings, is also found on Flemish clocks and occasionally on Germanic ones, probably those made in the western regions of Germany. Flemish clocks also have spiked pulleys. Three-wheel trains are normal on both Gothic and lantern clocks, although some Gothic clocks (primarily large ones) have only two wheels in both trains or sometimes only in the striking train.

The same kind of balance escapement is used on both types of clocks, but with characteristic detailed differences. Original foliots are rare and even then they are usually only found on Flemish clocks, the circular balance being the norm. Gothic iron balances are heavy, have deep rims with two spokes and hang by a cord from a combined top cock and gallows held to a top movement bar by a tenon and wedge. The rear of the crownwheel arbor pivots in an arm riveted to the rear of the central movement bar and curves round to the front, with both ends of the verge pivoted in curved iron cocks similar to that for the crownwheel; these allow ready adjustment of the escapement. In contrast lantern-clock balances are of light weight, have thin square-section brass rims and a single integral spoke with the lower end of the vertical verge supported in a brass bottom cock. Though this introduces more friction than a cord suspension it is acceptable with a light balance, whereas the heavy balance of a Gothic clock makes an end block less practical, though this is sometimes found on Flemish clocks with a light balance (Fig. 9). The rear of the escapewheel arbor pivots in a bridge through which the verge passes. Both the bridge and potence of a lantern clock are riveted to the front of the central movement bar and adjustment of the escapement is not easy.

The striking arrangements present even more differences, both fundamental and detailed. Whereas Germanic Gothic clocks

and early English turret clocks use the single-arbor nag's head,²⁴ and later German iron clocks continued with this system until the early nineteenth century, lantern clocks and almost all subsequent British clocks employ warned striking, first recorded by Leonard da Vinci about 1493–7.²⁵ The lifting piece with its pivoted tip (the nag's head) and the detents for locking, overlift and countwheel control are on a single arbor. This arbor, and that for the hammer, pivot in the corner pillars, while the two striking arbors and the hammer arbors of a lantern clock pivot between cruciform extensions of the front and rear movement bars. This type of movement bar is almost unique to English posted-frame clocks and later French or Dutch lantern clocks made in the English style.²⁶

Apart from a few, mainly Flemish, Gothic clocks where the hammer is pivoted on the top of the bell frame (Fig. 5), the hammer for the hour strike of Germanic clocks is usually positioned on the left-hand side and strikes the outside of the bell. A thin flat hammer spring is riveted to the right-hand side of the lower sub-frame and passes horizontally underneath the movement where it connects to a short arm on the hammer arbor by a wire link. There is no separate stop or counter, the hammer shaft stopping on the upper sub-frame. Flemish clocks sometimes have a vertical hammer shaft (Fig. 7). The hammer of an early lantern clock is on the right,²⁷ striking the inside of the bell, with a strong spring and a separate stop, both held by a screwed nut to the bottom and top plates respectively. Since Germanic hammers are in full view they are fashioned into a decorative shape, while English hammers are hidden inside the bell and so are quite plain.

On both types of clock the going greatwheel rotates once an hour and on Gothic clocks a

pin on this wheel lifts the nag's head, an arrangement necessitated by the early method of setting the alarm on these clocks. To ensure that the strike does not go out of sequence with the time indicated, the hand has to be fixed and can only be reset by lifting the balance (sometimes with a small lever, see Fig. 4) and letting the train run freely, while supporting the weight to avoid damage. The frets on lantern clocks prevent easy access to the balance and from the start there was a moveable hand with strike let-off by a twelve-pointed starwheel ('ratch') fixed to the hand arbor — a far more convenient method that was widely used on single-handed English clocks.

Some Germanic clocks have quarter striking or a passing strike on a separate bell (Fig. 2), in which case the quarter hammer is on the right, but early lantern clocks only strike on the hour. Even later quarter-striking lantern clocks are very uncommon.

Gothic clocks have a one-piece countwheel with the slots on the outside and the teeth on the inside of the rim, hence offset crossings are necessary to allow the pinion-of-report to engage with the teeth. Flemish clocks with transverse wheels have outside teeth and inside slots with the detent entering from the side, so offset crossings are not necessary. Lantern clocks have a separate countwheel and gear, so there is no need for offset crossings and internal teeth, both being more difficult to make.

The alarms on Gothic clocks are triggered by a peg inserted into a ring of twelve holes in the hour wheel, which is visible through a large circular aperture in the dial. Hence the alarm can only be set to a full hour and this basic system persevered on Germanic clocks long after more sophisticated methods were available. Alarm-setting discs, which rotate

24. John Robey, 'Nag's Head Striking', *Horological Journal*, Vol. 153 No. 11 (November 2011), 494–7.

25. John A. Robey, 'Leonardo da Vinci and the Earliest Known Clock with Warned Striking', *Antiquarian Horology*, Vol. 33 No. 6 (December 2012), 775–85.

26. An iron posted-frame clock, probably French, of about 1690, is known with very unusual cruciform central and rear bars, and a single right-hand arm on the front bar, see John Robey, 'A Trio of French Iron Clocks, 3. Cherubs and roses from Northern France', *Clocks*, Vol. 39 No. 8 (August 2016), 26–33.

27. This only applies to clocks with separate weights for each train, where the greatwheels rotate in different directions. On later clocks with a single weight on the Huygens' loop principle, both greatwheels have to rotate in the same direction and the hammer is on the left.

Feature	English Lantern Clocks	German Gothic Clocks	Flemish Gothic Clocks
CONSTRUCTION			
four corner posts	✓✓✓	✓✓✓	✓✓✓
brass frame	✓✓✓		
top plate or flat frame	✓✓✓		✓✓✓
bottom plate	✓✓✓		✓✓
screw-on finials	✓✓✓		
screws	✓✓✓		
front & side frets	✓✓✓		
engraved brass dial	✓✓✓		✓
signed	✓✓	✓	✓
side doors & rear cover	✓✓✓		✓
hanging hoop & spikes	✓✓✓		✓✓
TRAINS & WHEELS			
end-end trains	✓✓✓	✓✓✓	✓✓✓
transverse wheels			✓✓
brass wheels	✓✓✓		
3-wheel trains	✓✓✓	✓✓	✓✓
wheels & pinions at ends of arbors	✓✓✓		
spiked weight pulley	✓✓✓	✓	✓✓✓
spring click on spokes	✓✓✓	✓	✓✓✓
GOING TRAIN			
balance not foliot	✓✓✓	✓✓✓	✓✓
balance/foliot on cord		✓✓✓	✓✓
hand arbor pivots between bar & dial	✓✓✓		
movable hand	✓✓✓		
moon-work		✓✓	✓
STRIKING TRAIN			
let-off by starwheel	✓✓✓		
warning	✓✓✓		✓✓
countwheel with separate gear wheel	✓✓✓		
quarter strike		✓✓	✓
strike inside bell	✓✓✓		✓
vertical spring	✓✓✓		
gravity hammer			✓
horizontal hammer arbor	✓✓✓	✓✓✓	✓✓
strike-work pivoted between cross-bars	✓✓✓		
ALARM (IF FITTED)			
alarm disc	✓✓✓		
alarm on rear cover	✓✓✓		

✓✓✓ = usually present
 ✓✓ = sometimes present
 ✓ = occasionally present

Table. Comparison of the constructional and technical details of lantern clocks and Gothic clocks.

with the hour hand and can be set so the alarm will sound at any time, had been in use on Renaissance clocks since at least the mid-sixteenth century and were used on lantern and later English clocks. While some Gothic clocks have a lunar display (Fig. 2), this is rare on lantern clocks.

The hand arbor on iron clocks is a hollow pipe that rotates on a post riveted to the front movement bar. On lantern and later English clocks with brass dials the hand arbor pivots in the front movement bar and the centre hole of the dial.

These constructional and technical features are summarised in the Table, where it is clear that the differences between lantern clocks and Gothic clocks, both Germanic and Flemish, far outnumber the similarities. Hence it can be stated unequivocally that the accepted wisdom expressed by earlier horological authors that the English lantern clock was developed from the iron Gothic clock does not stand up to close scrutiny and we need to look elsewhere to find the inspiration that led to its development.

The basic concept of a posted-frame movement with end-to-end trains had been in use since the fourteenth century and this type of clock was employed in the majority of churches, so there was no need for English clockmakers to base their new designs on Continental Gothic clocks. What was needed was to take this standard form and modernise it with the latest decorative designs and technical developments so that it would appeal to an English, primarily London, market and make it easier to construct.

(Part 2 to follow in the next issue).