French Lantern Clock with Rack Striking

An Iron Frame and an Unusual Knife Edge Suspension

John Robey

Figure 1. Unsigned French lantern clock with an iron frame and rack striking.

English lantern clocks with rack striking are quite rare – currently only three are known: one by Henry Webster of Aughton near Ormskirk, Lancashire, about 1680, and much later ones by George Thatcher of Cranbrook, Kent, about 1725 and Alexander Giroust of London, about 1730.[1,2,3] The last named, not surprisingly, has some French features and the maker may be related to a Phillipe Giroust working in Paris in 1784–9. Rack striking posted frame longcase clocks are even scarcer.[4] On the other hand, French lantern clocks quite often use a rack and snail instead of a count wheel for striking.

English clocks with a verge escapement invariably use a knife edge suspension at the rear of the verge, but this type of suspension was only occasionally used in France. Continental clocks with verge and crown wheel escapements normally have a conventional pivot at both front and rear of the verge. The English preference for the knife edge is probably due to the use of a heavier pendulum bob which would cause undue pivot friction, compared with the very light bobs of German clocks with cowtail pendulums. Some French clocks with verge escapement (especially lantern clocks from Normandy) have bob pendulums with a similar mass to an English clock, but suspended by a thread and connected to the verge via a crutch.

The clock shown in **Figure 1** has a combination of rack striking and an unusual form of knife edge suspension. It has other interesting features, such as an iron frame and movement bars, a novel hammer stop and a re-used early iron wheel, all of which are discussed later.

The single-sheet brass dial, 6 ⅝in (169mm) tall by 4 ⅝in (117mm) wide with the chapter ring 6 ⅝in (169mm) diameter, is not silvered, as seems to be the practice on French rural clocks. The only decoration is a series of alternating straight and wavy lines radiating from the centre in a rather wispy sun pattern, with arrows to mark the half hours. The single hour hand is of a simple but pleasing design. The brass frets are of a different pattern from those on English lantern clocks and similar examples on French clocks have not been found in the literature. Unusually, the lugs or feet by which they are screwed to the top plate are at different positions on all three frets, **Figure 2**. This not only proves their originality to this clock, but also indicates that they were cast in a rather unconventional manner. Some of the lugs are not exactly in line with the lower edge of the frets, **Figure 3**, so the pattern for casting them is unlikely to have included them. It seems that the pattern for the flat part of the fret was moulded in sand, the pattern removed and then the lugs formed by pushing a suitably shaped metal strip into the sand. Sometimes these lined up with the lower edge and sometimes they were slightly

Figure 2. The lugs of the three frets have different spacings.

Figure 3. Some of the fret lugs are not aligned with the lower edge.

Figure 4. Detail of pillar and finial.

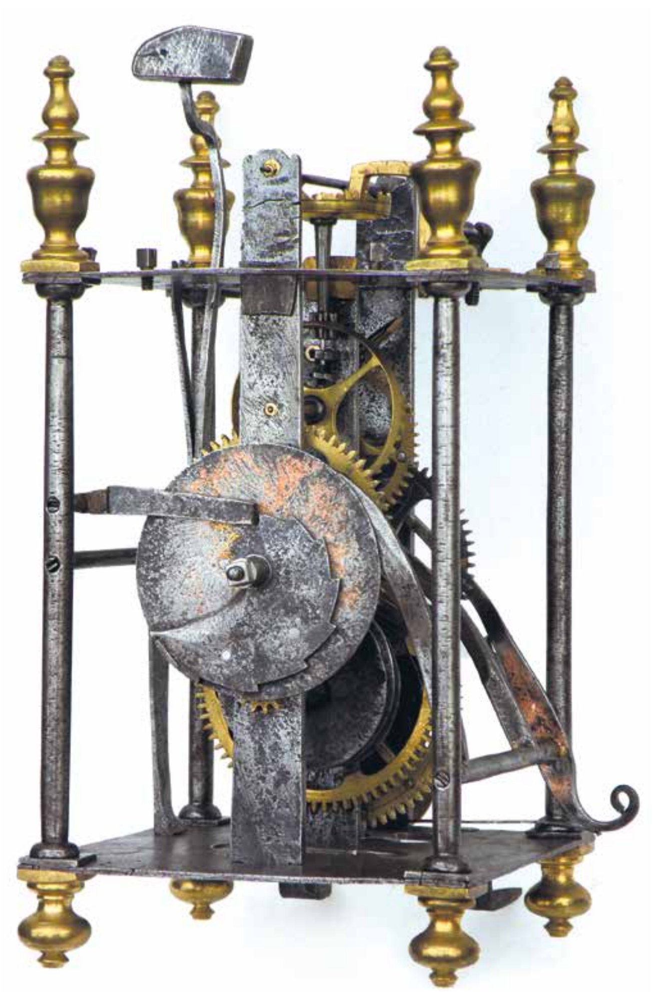

Figure 5. The movement from the front, showing the verge pivoted in extensions of the front and rear movement bars.

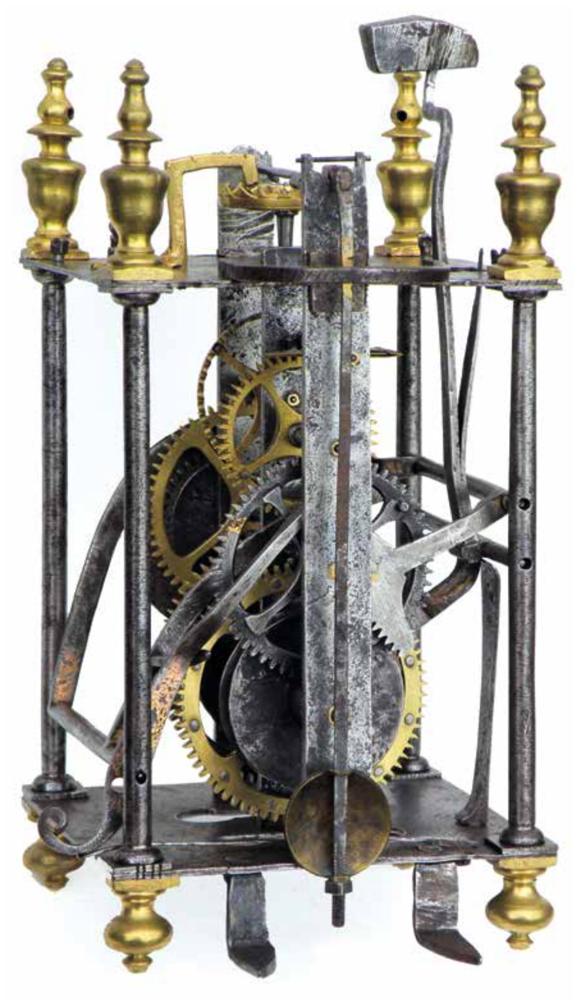

Figure 6. The rear of the movement. Note the knife edge suspension, the rack and the downward cranked spikes.

off. Frets cast in a similar manner are known on an English provincial clock of about 1670, but the frets on London clocks appear to be made using a pattern that included the lugs and produced identical castings.

There are conventional cast brass finials and feet, with a shorter finial on the top of the very slender iron bell strap, giving a total height of 14in (355mm). Instead of conventional cast brass corner pillars they are fabricated by adding capitals to iron rods that taper slightly. The rounded parts of the capitals are brazed in place with the square parts sitting above but not brazed to the finials or feet, which hold the pillars to the iron plates, Figure 4. The feet and finials are too tight to be easily removed, but it is assumed that they are screwed on to the ends of the pillars. There is a hoop for hanging the clock on a wall hook and two sturdy spikes riveted on to the bottom plate. These are cranked downwards to avoid the wide-swinging pendulum. Side doors and a rear cover were once fitted, but they are now missing. Apart from these and a later fly this clock is remarkably original.

The movement, **Figures 5–9**, is 10¼in (261mm) tall,

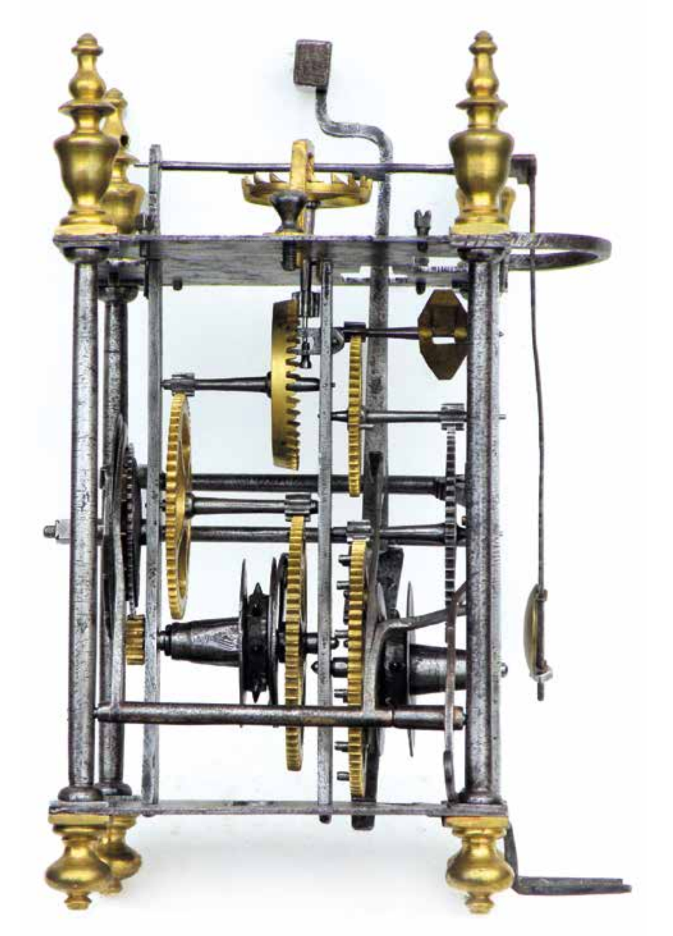

Figure 7. Movement from the right.

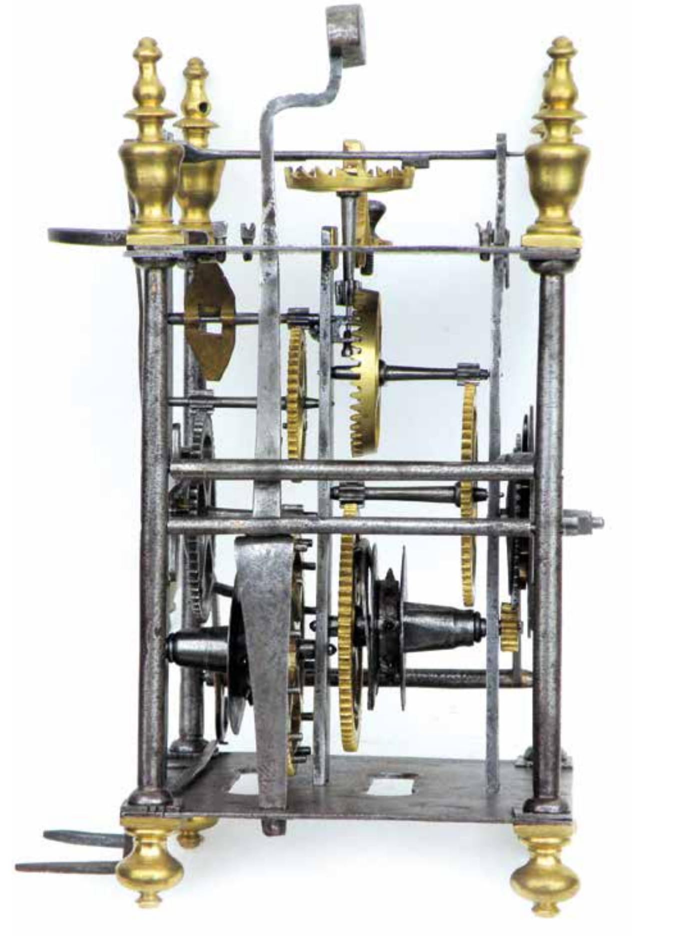

Figure 8. Movement from the left.

including the feet and finials, and 5¼in (134mm) square. The movement bars are straight, without the side arms typical of English posted frame clocks. On French clocks of this type the arbors for the hammer and the strike work pivot between the pillars, usually with a pivot on the arbor at the front and a large headed screw-in pivot at the rear. Here the headless pivot screws are at the front and recessed so that the dial can fit flush with the pillars. This is sometimes seen, but is not usual.

The wheels of the going train are of brass, **Figure 10**, apart from the iron hour wheel. The wheels of both trains are riveted on to collets turned on the tapered iron arbors. The clicks of the iron weight pulleys act on the crossings of the great wheel in the English manner, but while that on the striking train is of conventional construction that on the going train is formed differently. Usually the circular click spring is forged to give a sloping step, but here the step has been produced by bending over part of the outer rim, **Figures 11–12**. This is effective and easier to make, but it has not been seen before. There is no indication that it is not original. Both pulleys have been assembled by riveting the central pipe to the cheeks and centre without the use of through rivets as usual with brass pulleys. It would have been difficult to replace the click spring without dismantling the pulley, for which there is no evidence. The rope spikes of both pulleys are not simply the usual pointed pins driven into drilled holes, but appear to be inserted blocks filed to form points after assembly. These blocks may be dovetail in shape, but this cannot be confirmed without dismantling and their construction proved difficult

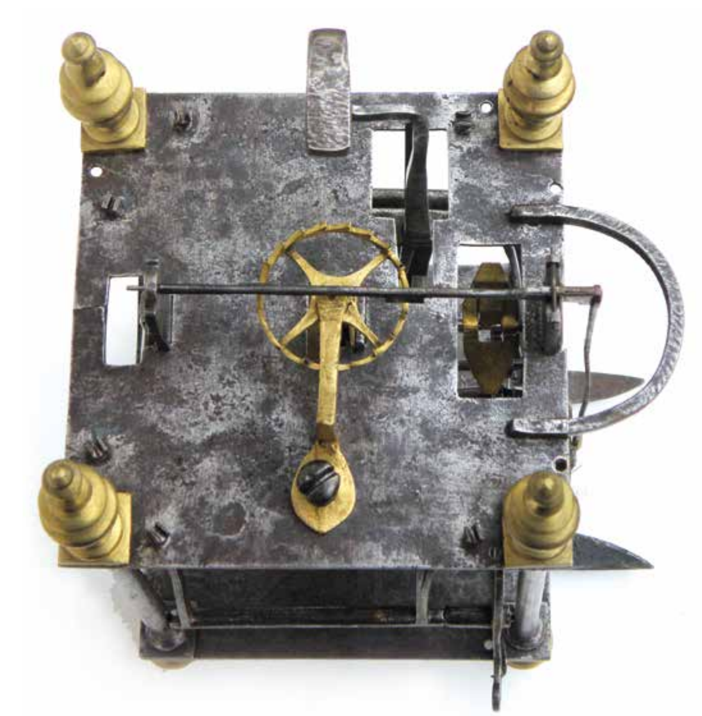

Figure 9. Top view showing the verge escapement.

to photograph clearly. There are separate weights and counterweights, not a single weight with a Huygens' loop as is usual on English thirty-hour clocks. Since both great wheels

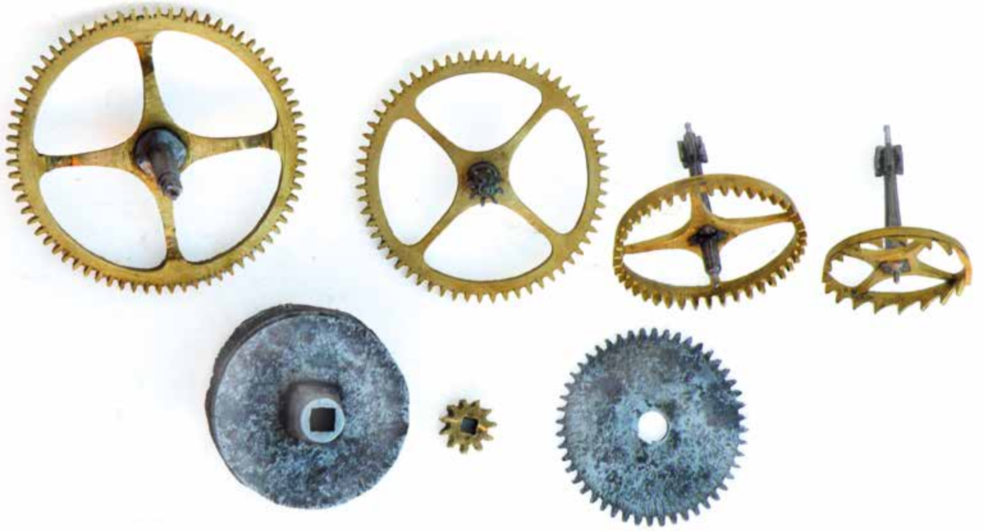

Figure 10. The going train with brass wheels, iron hour wheel and rope pulley.

Figures 11 and 12. The rope pulley from the going great wheel with an unusual construction of the click.

rotate in the same direction the two driving weights are on the left-hand side, rather than on opposite sides as found on English balance lantern clocks. While this may seem an illogical arrangement it was often used on rural French posted frame clocks.

The wheel and pinion counts of the going train are:

escape wheel	19 – 6
contrate wheel	60 – 8
second wheel	19 – 6
great wheel	72 – 11
hour wheel	48

The pinion-of-report of eleven leaves is unusual, though not unknown, resulting in the great wheel turning once in $2^3/_4$ hours and a duration of almost 32 hours for a 5ft weight drop. Usually, the ratio of hour wheel to pinion-of-report is an integer, though this is just convention and there is no requirement for it. The great wheel of a balance lantern clock rotates once an hour, giving a duration of about twelve hours, while for 'thirty-hour' longcase clocks it often rotates in four or three hours, only very occasionally less, though two hours is known.[5]

The verge of French lantern clocks with a short pendulum usually pivots in curved cocks screwed to the top plate. These allow adjustment of the position of the verge above the crown wheel to provide minimum drop of the pallets on to the tips of the crown wheel teeth. On this clock the verge is located between vertical extensions of the front and rear movement bars. This is sometimes seen on English thirty-hour clocks, especially those with an anchor escapement, but only for the front pivot. Here a knife edge at the rear of the verge sits in a vee-bed filed into the top of the movement bar and is retained by a long taper pin, **Figure 13**. This is a very simple and neat method that has occasionally been noted and only on French lantern clocks (see later).

Whereas on a British verge escapement the knife edge is behind the pendulum and sits in a back cock, here the knife edge is, by necessity, 'in-board' of the pendulum. The verge, pallets and knife edge are all forged and filed from one piece of iron, with the pendulum attached by means of a riveted mortise and tenon joint, **Figure 14**. While this simple method avoids a back cock, it does restrict the ability to make adjustments to the escapement. Hence, the bottom pivot of the crown wheel is supported on a screw in the potence—a method often used in Britain, but not often on continental clocks. A detail not often seen is the attachment of the potence to the movement bar by means of a taper pin, **Figure 15**; they are usually riveted firmly together.

The striking train, **Figure 16**, is quite conventional, with the winding click made in the usual manner, though the fly appears to be later. However, the second (locking) wheel presents a conundrum. While all the other spoked wheels are made from brass castings this one is much older and made of iron with a separate rim and crossings riveted together, as

Figure 13. The vee-bed filed in the top of the rear movement bar.

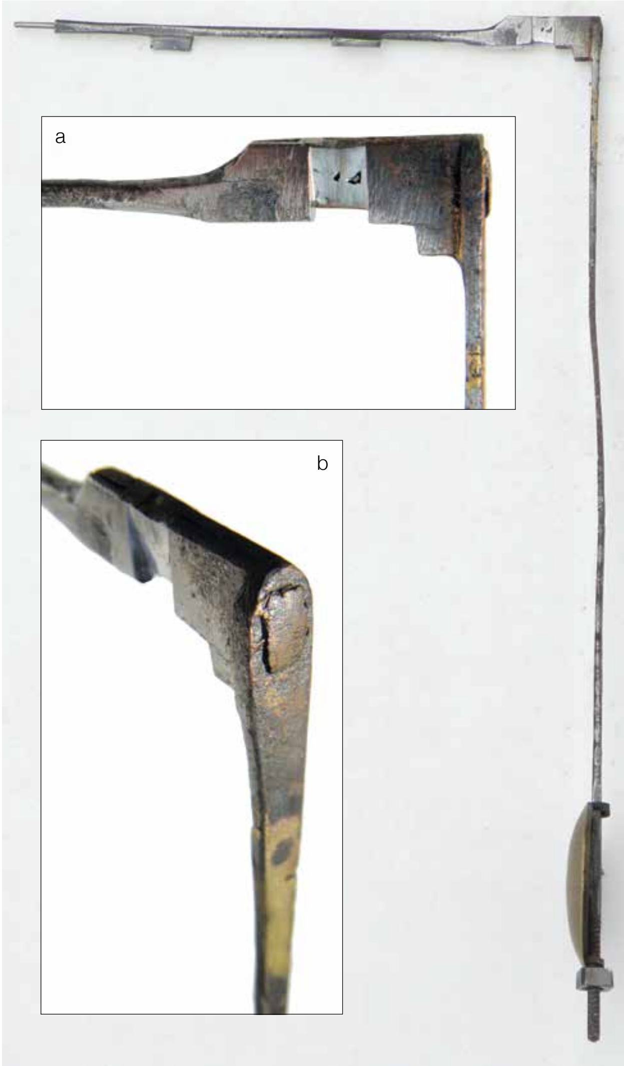

Figure 14. The pendulum and verge; a: detail of the 'in-board' knife edge, the faults in the metal do not affect its operation; b: fixing of the pendulum to the verge with a brazed repair to the pendulum rod.

Figure 15. Potence with screw adjustment, fixed to the central movement bar with a taper pin.

is normal for all-iron clocks, **Figure 17**. It is not obviously a later replacement and the fixing to its arbor does not look as if it has been altered, while the tooth gaps are similar to the brass wheels, which implies that they were made by the same person. Did the original maker just happen to have an iron wheel of the correct diameter and number of teeth in his spares box? There is no technical reason why this particular wheel needs to be made of iron. Being a rack striking clock it not only has a locking pin but there is also a gathering pallet filed into the end of the arbor, **Figure 18**.

The components of the strike-work are shown in **Figure 19**, which also includes the brass top cock for the crown wheel. The hammer has a conventional spring, though it is held to the bottom plate with a taper pin rather than a screwed nut. There is a very unusual hammer stop or counter which contacts the inside of the aperture in the top plate. It is forged as one piece from the hammer shaft, and is best seen in a separate side view, **Figure 20**. The top of the shaft is cranked over, a feature also seen on some Bristol-area lantern clocks. This is not simply to centre the hammer head on the bell (striking on the inside as usual), but to make adjustment much simpler. Slight twisting of the shaft is easier than trying to bend the shaft, which is often quite stout, especially on English posted frame clocks.

The other components of the strike work are an arbor with the lifting piece at the front and the warning piece and link in the centre. A pipe on the rack hook sits over a reduced diameter at the rear of the warning arbor, instead of having its own pivot stud. The other arbor has a rack tail at the front and the rack at the rear. The strike locks when the rack (which falls by gravity without the assistance of a spring) is lifted and a tab on its front side engages with a pin on the second wheel.

Though there is a curved extension arm on the rack hook for repeating the strike, biased by a leaf spring fixed to the bottom plate with a taper pin, it is of limited use. On any clock whose strike let-off is by a twelve-pointed star wheel which moves slowly (i.e. single handed clocks), warning is initiated about 15–20 minutes before the hour, during which period repeating is not possible. Since one of the main reasons for using rack striking is the ability to repeat the hour on demand, these limitations are probably why it is not often found on single-handed clocks, especially those from England.

On a two handed clock the let-off of the strike and the counting of the hours by the snail take place on separate wheels—the minute and hour wheels respectively. On a single handed clock the strike is let-off by a star wheel which, like the snail, has to be firmly fixed to the arbor carrying the hand, but adjustable with respect to the hour wheel. To ensure that the lifting piece only contacts the star wheel and the rack tail only falls on to the snail, the brass star wheel and iron snail are riveted on opposite sides of a large iron disc. It is an effective method, though it has not been seen before. The components

Figure 16. The striking train with an iron second wheel and a conventional click on the rope pulley.

Figure 17. Detail of the iron second (locking) wheel of the striking train.

Figure 18. The gathering pallet is filed from the arbor of the locking wheel.

Figure 19. Components of the strike work, including the hammer and hammer spring. Also shown is the crown wheel top cock.

Figure 20. Unusual hammer stop forged from the hammer shaft.

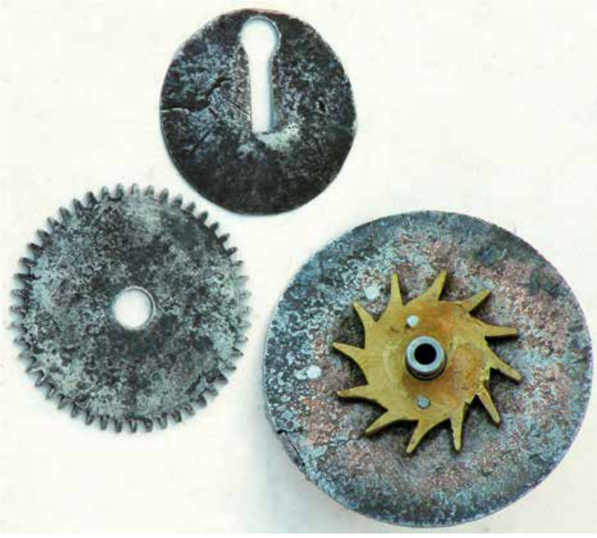

Figure 21. Components of the motion work.

Figure 22. Front of the motion work with the iron snail riveted to the disc.

are shown in **Figure 21** and assembled in **Figures 22–23**. The star wheel is hidden from view and sits between the disc and the hour wheel, **Figure 24**.

The dial is not signed and determining where it was made has to rely more on technical features that stylistic ones. Similar one piece dials were made in the Massif Central during the mid-eighteenth century, but they also occur, though less frequently, on Normandy clocks. Iron was frequently used on clocks from both areas, so this is of little help. Rack striking was certainly used in Normandy, but it is not restricted to that area, so again this provides little firm evidence.[6] Few books show sufficient detail to identify the suspension of the verge, but a small number of French lantern clocks with a knife edge are known. These include an unsigned clock with the knife edge suspended on a vee-bed in the rear pillar. It also has rack striking, though the frame is made of brass. It is said to be about 1710, but may be later.[7] Another example with a knife edge sitting in a vee-bed cut into the rear movement bar is signed by Viard of Etoutteville in Seine-Maritime, one of the two departments that comprise Upper Normandy.[8] This clock also appears to have rack striking, but the dial and brass movement are not similar to the clock described here and it is fitted into a tall case, so Viard is unlikely to have made the clock shown in **Figure 1**. It may be that this type of knife edge suspension was a feature of some clocks made in Seine-Maritime, hence the coastal region of northwest France is a strong contender for the origin of this one, which was probably made about 1740–60.

Figure 23. Rear of the motion work with the hour wheel held by the friction spring.

Figure 24. The brass star wheel is hidden between the disc and the hour wheel.

ENDNOTES

1. B. Loomes, *Lantern Clocks & Their Makers*, (Ashbourne: Mayfield Books, 2008) 301–2.
2. M. Pearson, *Kent Clocks & Clockmakers*, (Ashbourne: Mayfield Books, 1997) 37, 234.
3. G. White, *English Lantern Clocks*, (Woodbridge: ACC Art Books, 1989) 327.
4. Loomes, *Lantern Clocks & Their Makers*, (Ashbourne: Mayfield Books, 2008) 377.
5. J. Robey, *The Longcase Clock Reference Book Vol 1*, (Ashbourne: Mayfield Books, 2013) 213–14.
6. J. Robey, 'A French 8-Day Posted-Frame Clock', *The Horological Journal*, 156 (2014) 362–67.
7. B. Sénéca, *Les Inventeurs du Temps*, (Arras: Editions DeGeorge, 2009) 90.
8. Sold on French eBay, July 2013.