A French 8-Day Posted-Frame Clock

by John Robey

When we talk about French clocks what usually spring to mind are the ubiquitous *'Pendule de Paris'* movements fitted into a wide variety of cases ranging from Boulle marquetry, porcelain, bronze and gilt brass to so-called 'black marble' (actually Belgium slate). The French were also noted for their carriage clocks and fine precision regulators, while there are also the well-known Comtoise clocks.

1. Single-handed 8-day French posted-frame clock with restored alarm-setting disc.

Like most clockmaking countries, as well as the finely crafted types there were also less sophisticated country-made clocks. These include lantern clocks that range from rustic all-iron versions to those mimicking English style, and throughout this article the similarities and differences between the two clockmaking traditions will be emphasised. As well as many being made in Paris, French lantern clocks were also very popular in country areas until the late eighteenth century. By this time the English equivalent had become virtually obsolete, though they were still being made for export to the Ottoman Empire with so-called 'Turkish' dials. While English lantern clocks used engraved brass dials with silvered chapter rings to the end of their production, the later French clocks often have circular enamel dials or brass dials with Roman hour numerals on separate enamel cartouches or sometimes with additional ones for the minute numbers and maker's name.

Whereas English lantern clocks can be rather formulaic, French (and to some extent Italian) ones show a much wider variety of technical features. English clocks are virtually always of 12-hour duration for balance-wheel clocks or 30-hour for pendulum clocks – only two English 8-day lantern clocks are known.[1] Striking is usually controlled by a countwheel, rack striking being very unusual.[2] While there is the expected progression from balance-wheel escapement to verge escapement with a short pendulum then to anchor escapement with a long pendulum, technically the English lantern clock hardly progressed during its one and a half centuries or so existence. In addition its basic construction remained almost unaltered. The brass corner columns, finials and feet show only minor stylistic changes, while cruciform front and rear movement bars are almost universal. Of course this is a generalisation and one should always remember Mark Twain's quotation: *'All generalisations are false — including this one'.* There are a few chiming lantern clocks, or the hammer might be positioned on the top plate, and there are even a handful of English clocks with iron frames, as well as the one-off, but these are unusual.[3,4]

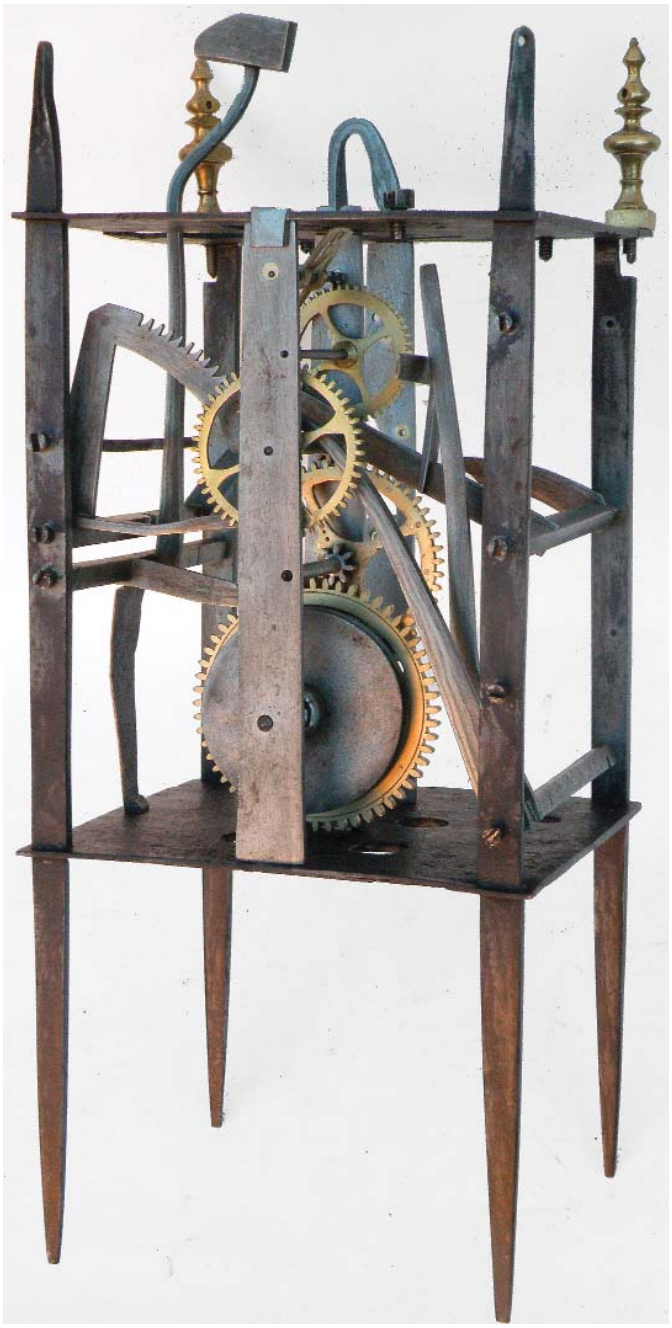
Not only do French lantern clocks show a much greater variety in their technical features, there is also a greater diversity of style and in their construction. Rack striking is frequently found, 8-day duration is not uncommon and the striking arbors typically pivot in the corner posts. There is sometimes datework or moon phase (including globe moons), multi-bell carillons, a centre-seconds hand or a coup perdu ('lost beat') escapement. Despite this, some French lantern clocks do follow English style and construction quite closely.

Northwest France, including Normandy and Brittany, was one of the regions that produced some very distinctive lantern clocks, usually made of iron and often housed in tall wooden cases. The unsigned clock shown in **Figure 1** stands on very tall iron spikes, more like legs than feet, characteristic of clocks from rural Normandy and Brittany. It probably dates from the middle of the 18th century, has rack striking, a passing half-hour strike, an iron frame and runs for a week depending on the weight fall. Instead of one weight on the Huygens' loop system, as found on most English and French posted-frame 30-hour clocks, this one is powered by separate weights for the going and striking trains, probably to avoid a very heavy single weight. The alarmwork was missing but there were enough clues to restore it and this is described later. A clock with the same fret, long legs, rack striking and the same type of alarm, though

2. The movement from the front with the restored alarm and passing half-hour hammer.

without finials and probably of only 30-hour duration, is said to be Breton and date from around 1770.[5]

So far it has been described as an 8-day lantern clock, but it probably would have been fitted into a tall case of carved oak, rather than having sat on a wall bracket, so the tall legs would not have appeared so ungainly. While one book devoted to these clocks refers to them as lantern clocks and does not illustrate any cases, the explanation for the tall spikes is probably to take account of the construction of the case with the seatboard set quite low down.[6] The examples with the longest legs are said to be Breton, but without any justification, and it may be that they were made to suit the cases of a particular local 'school' of cabinetmakers. In the absence of further diagnostic features it is tentatively designated as Breton. It is a



3. The movement from the rear without the alarm or half-hour hammer.

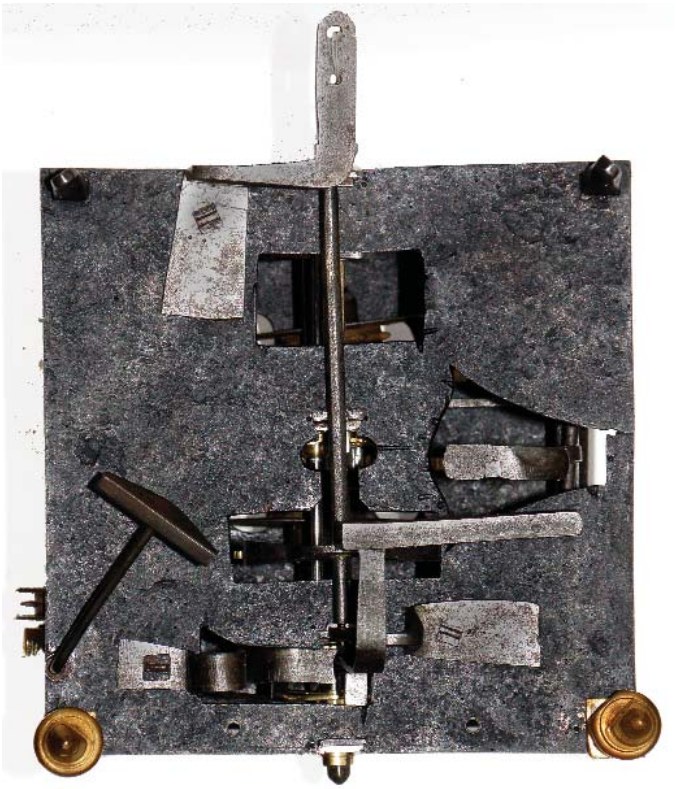
fairly large clock, standing 18½in (470mm) tall, the legs being 5in (127mm) long. The dial is 7½in (190mm) tall by 6½in (165mm) wide and the plates are 63/8in (162mm) square.

The dial is a sheet of thin beaten brass with no decoration or signature, with a silvered brass chapter ring. Both the dial sheet and the chapter ring are held with the same two screws into a vertical iron bar — like an additional movement bar — that also acts as the front bearing for the hour-hand arbor with its restored concentric alarm-setting pipe, as well as the passing half-hour hammer. As it is a single-handed clock the chapter ring has inner quarter-hour divisions, but there are also outer minute divisions with every fifth one numbered. Both the minute numbers and divisions have been partially filed off and it is likely that the unknown clockmaker used what he had in stock rather than obtaining a chapter ring specifically designed for use with a single-hand. There is no evidence that is has been changed.

There is a decorative cast brass fret and a pair of brass finials, all only at the front. A central brass finial sits on top of the

bell frame, which has pins at the ends of the arms to hold it onto the front finials, in the English manner. At the back vertical extensions to the corner posts act as rear attachments for the bell frame. The lack of side frets or rear finials supports the view that the movement was originally housed in a tall case, reinforced by a lack of hanging hoop or spikes. In addition both heavy weights are on the same side, making it very unstable if mounted on a wall.

Front, rear and top views of the movement are shown in **Figures 2-4**. The frame comprises rectangular-section iron corner pillars, sheet-iron top and bottom plates and iron movement bars, numbered 1-3 from the front. These bars, **Figure 5,** have twin projections that fit into holes in the bottom plate and are held at the top with wedges, as typically found on English posted-frame clocks, however there are no side arms. Cruciform front and rear movement bars are a specifically English characteristic, though sometimes found on Dutch and French clocks made in the English style. The pivots fit either directly into the iron bars or into brass plugs. The pivots of both



4. Top view showing the pallet arbor and the hammers for hour and passing half hour and the restored alarm hammer.

5. Iron movement bars with no side arms and original brass plugs for some of the pivot holes.

6 The brass wheels of the going train together with the iron hour wheel and iron snail (top left), the iron rope pulley and the large brass pinion-of-report (lower right).

7. Punch marks on the teeth of the going second wheel.

8. Components of the hour wheel, starwheel and snail assembly.

great wheels run directly in the iron bars as do the pivots of the rest of the striking train apart from the fly which, like the rest of the going train, runs in brass plugs. These plugs are likely to be original as some have noticeably off-centre pivot holes.

The pivoted wheels of both trains are brass. The counts of the going train, **Figure 6,** being:

escape wheel	30 — 6
3rd wheel	60 — 6
2nd wheel	72 — 8
great wheel	56 — 28
hour wheel	24

The third wheel in the illustration is noticeably thinner than the others, has a very narrow rim, one of the crossings is cracked and there are filed-off iron rivets (with no apparent purpose) at the base of each crossing. It is clearly a replacement and not surprisingly the clock did not run reliably. It was replaced and while performance improved, timekeeping was a long way outside the adjustment range of the original pendulum. A calculation showed that the 56-toothed wheel should have had 60 teeth, resulting in a 1-second pendulum. It appears that a damaged wheel had been replace d by whatever could be found in a scrap box and with a new wheel of the correct count the problem was solved.

There is no centre wheel as normally found on an 8-day clock, instead there is typical 30-hour single-handed motionwork. The difference being that the iron hour wheel is driven by a larger brass pinion-of-report in the ratio of 0.857:1, compared to 3:1 or 4:1 expected on a 30-hour clock, to give an extended duration. A weight drop of 5ft (1.5m) gives a duration of about 7½ days, so a rather tall case would be needed to give a full eight day's running time. Such a tall case would not be unusual and they can be up to 8ft 9in (2.7m) tall.

The teeth of the second wheel (and only this wheel) have punch marks, showing that this wheel at least was marked out

.9 The pallet arbor, crutch and front and rear cocks.

10. The forged-iron anchor pallets.

using a dividing plate and the teeth cut by hand rather than using a cutting engine, **Figure 7**.[7] Since there is rack striking the usual hour wheel and starwheel for letting off the hourly strike of single-handed clocks is supplemented by a snail. The iron snail is fixed to the brass starwheel by a screw, with the friction drive and hand-setting provided by a thin iron disc and the usual slotted retaining washer, **Figure 8**.

The iron winding pulleys on both trains have clicks that act on the crossings of the great wheels, but instead of the familiar forged ring with a sloping step. The clicks are brazed to very thin iron discs riveted to the opposite edge of the pulley shrouds.

Figure 9 shows the pallet arbor of the anchor escapement and the two iron cocks with brass bushes in which it pivots. The curved front cock is the typical construction for French iron clocks and allows adjustment of the escapement. The pallets, **Figure 10**, are also of forged iron and likewise can be adjusted. The small lead pendulum bob is similar to that on early Comtoise clocks and hooks onto the end of the rod, **Figure 11**. The pendulum rod hangs on a thread, as often used on French clocks.

The counts of the striking train in **Figure 9** are:

fly	— 5
warn wheel	50 — 5
locking wheel	50 — 8
(2 locking pins & 2 gathering pallets)	
pin wheel	48 — 8
(12 hammer pins)	
great wheel	56

The pinions of five leaves are not common. To extend duration the locking wheel has two pins and there are two nibs to gather the internal rack.

All the arbors of the strikework pivot between the corner posts, typical of Continental posted-frame clocks. On English

11The lead pendulum bob.

12. The striking train. Note the two locking pins on the third wheel and the twin gathering pallets filed from the arbor.

clocks these would be held in horizontal extensions of the front and rear movement bars. Pivots at the front of the square-section arbors fit into holes in the pillars, while at the rear separate pivots screw through the pillars into holes in the arbors. This is the usual French method, which was only used by a few English clockmakers, notably John Belling of Bodmin, Cornwall. In contrast on Germanic posted-frame clocks pivots at both the front and rear of the arbors fit into holes in the pillars. The pillars are held to the plates with screwed nuts with slots at diagonally opposite corners of the top plate to ease assembly.

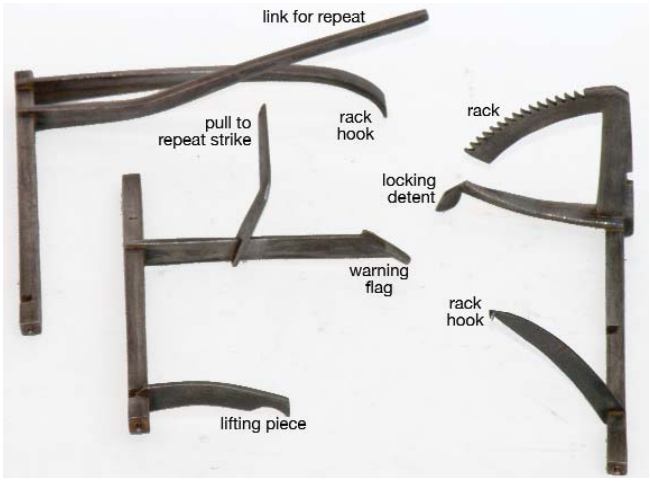
There are the usual separate arbors for warned striking with an arm on the warning detent that lifts a vertical arm on the rack-hook arbor to repeat the strike when pulled (there being a hole at the end for a cord) — repeating being the main reason for using rack striking. The rack is at the rear of its arbor, with the rack tail at the front so it can fall onto the snail. When the rack is fully gathered a detent intercepts one of the two pins on the third wheel to lock the train, **Figure 13**. All the strikework operates under the force of gravity, there being no spring assistance.

The hammer shaft swings in a vertical plane to strike the inside of the bell, with its spring held on the bottom plate, as on English posted-frame movements, rather than a vertical twisting hammer shaft as is often found on some French (also some German and Italian) clocks. However, the hammer stop is a sturdy round-section horizontal rod screwed through the right-hand rear pillar in a manner reminiscent of the delicate springs found on the familiar Pendule de Paris movements. The short arbor of the passing half-hour hammer pivots between the front movement bar of the going train and the bar at the very front of the movement that support the hand arbor and the dial. Its spring is held to the top plate with a screw. **Figure 14** shows the two hammers and their springs.

The alarm was missing so a replacement setting disc was cut from a scrap brass dial, based on a Normandy timepiece alarm owned by a friend. Alarms are very simple mechanisms, usually comprising a crownwheel and a vertical arbor with free-running verge pallets having a hammer at the top end. The weight pulley is normally on the crownwheel arbor with no intermediate gearing. Alarm crownwheels normally pivot on a short post in such a way that the verge can pass across the wheel's centre. But this is not possible here as the crownwheel had been pivoted on a long arbor between the left-hand pillars. Empty holes in the top and bottom plates indicated the position of the vertical verge, allowing the offset of the verge to be measured.

It is normally said that crownwheels, for both escapements and alarms, must have an odd number of teeth and the axis of the verge must pass through the centre of the wheel. However, neither of these requirements is strictly true. If the verge is offset from the wheel centre then either an even or an odd number of teeth may be used. The actual requirement is that the verge axis should lie directly over the tip of one tooth and, for equal drops on each pallet, exactly half-way between the teeth on the diametrically opposite side of the wheel. While equal pallet lengths are not essential (especially for such a crude mechanism as an alarm), this is recommended for best action. Knowing the fixed parameters (in this case the offset) combinations of the number of wheel teeth and its diameter were tried until the above requirement was met. A simple computer drawing programme made this a straightforward task.[8] The offset of the verge was measured as 8.1mm resulting in a 38mm diameter wheel with 13 teeth, which was fitted with a stop pin on its circumference and mounted on a round arbor.

A large hole in the bottom plate showed where the rope passed — the other end was outside the plate — to indicate the pulley size. The long verge was easiest to make and looked more authentic by using traditional hand methods. The arbor with its pallets was sawn from mild steel strip and filed to a round section, aided by a wooden block with a V-groove, particular care being taken in the region of the top pivot. The section between the pallet flags was raised to red-heat and twisted so they were at 90 degrees. A brass bush was fitted on the lower end so the arbor could be held concentrically in either



13. Components of the strikework.

14 The hour hammer and spring (right) and passing half-hour hammer and spring (left).

15. The new components of the restored alarm.

a lathe chuck or collet to turn the reduced diameter of the bottom pivot. If the flags will not pass through the spindle bore of the lathe then a fixed steady is necessary. The flags were filed to shape and gradually reduced in length until there was free action. The top of the verge was bent over and a double-ended hammer fitted that bounced to-and-fro inside the bell.

Alarm release mechanisms are equally simple: usually a two-armed pivoted lever, one arm being either lifted or allowed to fall at the appropriate time to unlock the crownwheel which is held by a detent on the other arm. On English lantern clocks the lever pivots between the dial and the rear cover, but here it pivots between the left-hand pillars. The alarm-setting disk is squared onto a short pipe with an oval brass spring at the rear. This slips over the hand arbor and is held in frictional contact

16. The left-hand side showing the crownwheel, lever arbor (second from bottom) and vertical verge of the restored alarm.

with the hour wheel by pressure from the hand. English practice is for the alarm lever to ne lifted by a pin on the oval spring. For this clock a Normandy example was copied that had a separate brass disc with a notch that allowed the detent to fall and unlock the crownwheel. The new components are shown in **Figure 15**. The ironwork was chemically blacked which was then partially removed with a wire brush to achieved the desired 'aged' look, yet still distinguishable from the original components. The assembled alarm is shown in **Figure 16**.

In conclusion, this is an interesting example of an 18th-century lantern/longcase clock movement made in northern France, that exhibits many technical differences to an English posted-frame clock. I am still not sure if it should be called a lantern clock, a longcase clock movement or a hybrid of both but it illustrates some of the contrasts between the two clockmaking traditions.

References

1. LoomesBrian, *Lantern Clocks & Their Makers* (2008, Mayfield), pp427-32.
2. Loomes Brian, *Lantern Clocks*, pp301-2, 376, and Pearson Michael, *Kent Clocks & Clockmakers*, (1997, Mayfield), pp37, 234, show exceptions.
3. Robey John A, Antiquarian Horology, March 2011, pp689-704 *'English Lantern Clocks with Iron Frames'.*
4. Robey John A., Antiquarian Horology, September 2010, pp405-16 *'An Unusual English Lantern Clock'.*
5. Bollen Tom, Franse Lantaarn Klokken (in Dutch, 1978), plates 50-53. Other clocks with the same fret are shown in plate 29 Normandy dated 1752, plates 47-48 Brittany about 1720, plate 49 Brittany about 1720.
6. Bollen Tom, Franse Lantaarn Klokken.
7. Robey J A, *The Longcase Clock Reference Book* (enlarged and revised 2nd edition, 2013 Mayfield), pp138-140, describes and illustrates the use of the dividing plate.
8. I am indebted to Jim Arnfield for advice on this.