LIEGE ALARM

by **John Ro**

Figure 1. *Liège alarm, with a brass dial, brass fret and a pewter chapter ring.*

Figure 2. Tabs at the top of the dial held by the thin fret.

In an ideal world collectors like their artefacts to be in a similar condition to when they came out of the artisan's workshop. But different standards and considerations apply to the various types of collectables. The slightest chip will devalue a porcelain plate, while a serious crack can render it almost worthless to a ceramic collector unless it is a very rare and much sought-after early piece, and restoration does little to regain its value. Collectors of antique furniture are much more forgiving and they prefer the patina and wear that comes from several centuries of use and handling by many generations of previous owners. Undamaged pieces of furniture are not discounted and a reasonable amount of sympathetic restoration is accepted. On the other hand oil paintings by the great masters are often—or even usually—restored, old varnish cleaned off and damaged areas repainted.

So where do clocks come in this? Like any item that has moving parts, clocks are subject to wear and will have been repaired in order to keep them working. Since they perform the practical purpose of telling the time to an acceptable degree of accuracy, they might have had changes made to take advantage of the latest technology. This usually involves improvements to the clock's escapement, especially changing the balance of an early lantern clock to a short verge pendulum or to a long pendulum. Once the long one-second pendulum was found to be reliable and adequate for most domestic purposes there was little need for further changes

CONVERSION

bey, UK

Figure 3. Tabs on the fret holding the dial of a two-handed Liège clock (from Klokken Kijkboek by W F J Hana, 1978).

Figure 4. Cut-off pin on the back of the alarm disc and the large central hole in the dial.

and eight-day longcase clocks that are well maintained and regularly serviced were rarely modified. This of course does not apply to short duration clocks, such as 30-hour longcases, and they were often given the drastic update treatment of simply replacing the old movement by an eight-day one.

Most collectors like to have original clocks with few changes and only a modest amount of sympathetic repair and restoration. While replacement of missing pull-repeat work or anchor escapements reconverted back to verge on bracket clocks is no longer encouraged, often a modified clock has to be accepted.

Anyone hoping to acquire a lantern clock with an original balance will need a great deal of patience. While such clocks do exist, they are rare and only come on to the market very infrequently. From some points of view modified clocks can be regarded as interesting as unaltered ones. Not only is there the detective work in discovering what was there originally and when the changes were made, but for an author there is much more to write about. Clocks can be more interesting when they have been changed than when completely original—but purist collectors are not likely to agree.

Which brings us to the subject of this article, shown in **figure 1**. It is a small short-duration rural clock with a thin brass dial and fret, a pewter chapter ring, a single iron hand, and brass wheels, in a simple iron frame with square corner pillars and no finials or feet. It is clearly not English, and like most country-made

Figure 5 (above). The simple iron hand.

Figure 6 (left). The iron frame with riveted pillars.

Figure 7 (above). Original iron movement bars and the later brass bar.

clocks from Continental Europe, it is not signed. It was said to be from the southern part of the Netherlands, and this proved to be almost, but not quite, correct. After trawling through the horological literature I found an illustration of a similar clock in a Dutch book that said it was from Liège in Belgium. It was subsequently discovered from a contact in Antwerp that while these clocks are usually said to be from Liège, it was probably made in the Herve region to the east of the city, towards the German border. While it cannot be attributed to any specific clockmaker, a date of about 1730 or earlier was suggested.

It is a modified clock, but instead of the usual escapement update it was changed from a timepiece and alarm to a striking clock, probably some time in the late eighteenth century or early nineteenth century. It is likely that the owner wanted a striking clock, but being of limited means could not afford a new one. Instead he was prepared to forego the alarm feature and get a local clockmaker to replace it with a striking train. Before describing how this change was accomplished, the clock as it would have been is described first.

The thin rectangular brass dial sheet is 5$^{1}/_{2}$in (140mm) tall by 4in (102mm) wide, with a pewter chapter ring 5in (127mm) diameter fixed to it by four screws. Two small tabs at the bottom of the dial sit in holes in the plate, while larger tabs sit in locating recesses in the top plate and are held by the thin and relatively tall sheet-brass fret, **figure 2**. This simple and neat method is only practical with dials and frets that are thin. A more obtrusive variant of the same method holds the dial by two tabs on the fret sitting in front of the dial, **figure 3**.

The brass alarm-setting disc, which has been recently silvered, masks a large hole in the centre of the dial, **figure 4**. This was necessary as the pin (now cut off) to lift the alarm lever was on the back of the disc and its pipe was just a friction fit on the hand arbor. This arrangement is even simpler than that found on English alarms. The iron hand, **figure 5**, has a thick central boss and tapers towards the tips.

The iron frame, **figure 6**, has thin square

Figure 8. Original going train and later starwheel.

Figure 9. Going pinion-of-report with four prongs.

Figure 10. Top plate with rear extension.

Figure 11. Extended bottom plate with two additional chain holes. The redundant holes for the alarm rope are marked 'A'.

pillars that are riveted flush with the plates, without finials or feet, as is typical of rural clocks made in the Liège area. The front and central movement bars are made of iron with inserted brass bushes, and the original rear bar would have been very similar. The movement bars are straight, **figure 7**, without the side arms found on English lantern and other posted-frame clocks. Empty holes in the plates indicate that there were once side doors, a rear cover and side frets, probably all made of painted iron, that were removed when the striking train was added.

The wheels of the going train are relatively thin and made of brass, **figure 8**. The second wheel has four crossings, but the other two wheels have three crossings. A four-pronged pinion-of-report filed on the end of the greatwheel arbor drives the iron hour wheel (**figure 9**). The crownwheel for the alarm would have rotated on a post on the back of the central movement bar, with the verge pivoting between a small cock or potence on a rear bar, also made of iron, and the top plate. The alarm hammer at the top of the verge would have rattled inside the bell, which, like its bell stand is probably original.

To enable the clock to strike the hours and half hours the clockmaker updating the movement had to make several changes. The first thing do was to remove the rear bar and all the parts associated with the alarm: the verge, crownwheel and the let-off lever. Since a striking train takes up more space that a simple alarm, the rear of the frame needed extending by

Wheel counts

Going train

escapewheel	28	8
2nd wheel	48	6
greatwheel	72	4
hour wheel	48	
beat = 0.90 seconds		

Striking train

fly		6
locking wheel	54	6
2nd wheel	60	8
greatwheel	60	6
countwheel	36	
hammer pins	15	

Figure 12 (above). Striking train from a Dutch clock.

Figure 13 (left). Striking pinion-of-report with six prongs.

Figure 14. Clockwise from bottom left: countwheel retaining spring, countwheel, pallet arbor and crutch, countwheel / locking / overlift detents, nag's head, modified backcock.

riveting iron strips on to the top and bottom plates. Cutting a slot for the hammer weakened the top plate, so it had to have extra pieces added for support, **figure 10**.

The bottom plate was also extended and two new holes were cut to take a chain (there was probably a rope originally), leaving the now redundant smaller holes of the alarm rope, **figure 11**. The rear movement bar that held the alarm verge was replaced by a brass one, along with a striking train, **figure 12**, and the associated strikework, hammer, spring, and countwheel, **figure 14**. A starwheel with 24 points to let off the hour and half-hour strikes was fixed to the hour wheel. These additional wheels are considerably thicker than those of the original going train, as can be seen in the side views of the movement, **figures 17** and **18**, and they have four parallel crossings. They were from an eighteenth or nineteenth century Dutch *Stoelklok* or *Staartklok* movement, probably made in Friesland, Groningen or Drente.

After making sure that the brass rear bar fitted between the plates, the pivot holes were drilled through into the central bar. There was the risk that the pivot holes might clash with those of the existing going train, and it might have been better to use a set of new parts. It is difficult to decide which course of action was taken: new parts would have been easier though more expensive, while finding an old but reusable movement of about the right size would not have been easy. Since the arm of the countwheel detent needed kinking to shorten it slightly, reused parts may have been the course of action taken.

The arbors for the strikework and the hammer are pivoted between the corner pillars, which are riveted to the plates with no screw-in pivots of the type used on French lantern clocks, nor the removable pillars found on German clocks. Though the ends of the pillars look undisturbed the riveting must have been removed and then redone after the old alarm lever had been removed and the new arbors inserted, leaving few traces of re-riveting. The

Figure 15 (left). Front of movement with the added starwheel and nag's head.

Figure 16 (right). Rear of the movement with the added striking train, brass movement bar and countwheel.

backcock was rather crudely modified so it could now sit over the top of the new rear bar and a longer pallet arbor was needed. The modified movement with its added striking train is shown in **figures 15** to **19**.

Dutch weight-driven clocks continued to use the early nag's head system of striking, whereas warned striking was used from the start of domestic clockmaking in England. On this conversion the nag's head is squared on to the front of the single strikework arbor with the combined locking, overlift and countwheel detents squared on at the rear.

A few minutes before the hour or half-hour the starwheel starts to push up the swivelling tip of the nag's head, but the train is not released immediately. Once the train is unlocked a 'heart' overlift cam lifts the nag's head above the starwheel and at the end of the strike the pivoted tip falls on the other side of the starwheel tooth, ready for the next sequence of strikes. This delay serves the same purpose as the few minutes a clock is held on warning—it ensures that the lifting piece will fall on the other side of the lifting pin.

This clock has two notches on the overlift cam and as a result the greatwheel rotates at half the speed, and with twice as many hammer pins the duration is doubled. This is analogous to some English 30-hour clocks that have two gaps in the hoop on the locking wheel to double the duration of the striking train.

When it was a timepiece the going train would have had a weight in a single drop and a counterweight, but now both trains are powered by one larger weight using a Huygens' loop. It is often thought that this arrangement will double the duration, but this is not so. Using a pulley and doubling the rope or chain will double the duration of the going train, and the same applies to the striking train. But if both trains are powered by the same weight it will drop by half the distance for the going train, plus half the distance when striking, with no overall increase in running time. The only advantage is that just one weight needs pulling up instead of two smaller weights,

Figure 16. Rear of the movement with the added striking train, brass movement bar and countwheel.

Figure 18. Right-hand side of the movement. Note the thicker wheels of the later striking train.

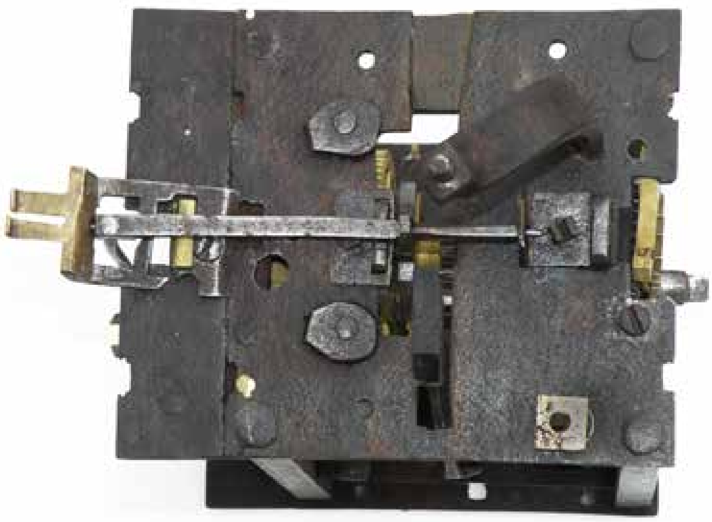

Figure 19. Top of the movement showing the escapement and modified backcock.

and there is maintaining power—though this is of dubious benefit for a single-handed clock.

With this clock the situation is not straightforward because the going train has a duration of half a day for a single weight drop, while the striking train will run for longer. There is a simple rule-of-thumb for clocks where the hour wheel and the countwheel are driven by a pinion-of-report on the end of the greatwheel arbor. If the wheel-to-pinion ratio is 12:1 it will run for half a day, if 6:1 the duration is a day and and longer for smaller ratios. With this type of clock the weight usually drops about 6in for one rotation of the greatwheel. For example, the counts of an English balance lantern clock are 48 / 4, so in 12 hours (one revolution of the hour hand) the rope pulley turns 12 times and the weight drops 6ft and it will then need pulling up again.

For the Liège clock the wheel / pinion ratio is 48 / 4 = 12 for the going train, so the weight drops to the floor in 12 hours or in 24 hours when the chain is doubled. For the striking train the wheel / pinion ratio is 36 / 6 = 6 and the weight falls in 24 hours or 48 hours with a doubled chain. In practice the the striking pulley is smaller than the going one, and the actual duration of the striking train alone with a doubled chain is nearly four days. With a Huygens' loop the average duration of the clock is 20 hours, which means that in practice it still needs winding more than once a day. This example emphasises that with a Huygens' loop the total duration is dominated by the fastest turning greatwheel and slowing the striking greatwheel will have a limited effect. Only by stopping the strike altogether will a Huygens' loop double the duration.

If the diameter of a pulley is required there is no need to struggle to measure the distance between opposing spikes with callipers. Just make sure that the rope or chain is hanging so that both sides are parallel and measure the distance between the centre lines with a ruler. This will give the effective diameter, which is somewhere between the diameter of the pulley centre and the tips of the spikes.

Collectors may prefer a completely unaltered and pristine clock, but this example shows that even modified examples still have much—or even more—that is of interest and they should not be dismissed out of hand.