

MINUTE REPEATING IN TOMPION'S LIFETIME

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An article in the Winter 1993 edition of this journal re-dated the known introduction of the minute repeating watch to around the first decade of the eighteenth century in Bavaria. That article attributed the earliest surviving example to Benedikt Fürstenfelder of Friedberg and predicted that closer examination of German repeaters would reveal further examples attesting to a forgotten monopoly centred on that town. A watch has now emerged confirming the attribution and fulfilling the prediction. In so doing it pushes back the date of invention to within the lifetime of the most celebrated baroque watchmaker, Thomas Tompion, against whose known production this innovation is here measured.

Late, somewhat the worse for wear and consequently misunderstood, a nevertheless unimpeachable witness confirms an extraordinary premise. The witness is an incomplete German watch (Figs 1 and 2). The premise is that for half a century, the ultimate specification of baroque watchmaking was the monopoly of an unheard of community a thousand miles away from the centre of excellence and invention. The watch was unknown seventeen years ago when an article in this journal re-dated the introduction of minute repeating from the middle of the eighteenth century in London to around the first decade of that century in Upper Bavaria.¹ Transferring the laurels of priority from the great London watchmakers Thomas Mudge and John Ellicott to an earlier and much less distinguished generation in Friedberg was controversial. Curators of horology in England and America had dismissed the proposition prior to its publication. Their view was echoed by a review of the article in Germany suggesting that the cited minute repeating mechanisms could be later modifications.² After a long wait for further evidence, a pocket watch has now emerged that disproves that criticism. Before considering this watch it should be remembered that a peculiar feature of early eighteenth-century German pocket watches, especially those from

Friedberg, is that they were often engraved or re-engraved with false London signatures and also signed with the names of other European metropolitan makers. The earliest minute repeating watch described in the above-mentioned article was an early eighteenth-century silver pair cased watch inscribed 'Marquich, London' (Figs. 3, 4 and 5). This watch was attributed in that article to Benedikt Fürstenfelder, noting that the signature 'Marquich' situated alongside a removed maker's name, appeared to derive from a partial re-engraving of the place name Aichach. Fürstenfelder was one of the very few watchmakers who worked around that time in Aichach, which lies ten miles from Friedberg across the river Lech from Augsburg. He had left Aichach permanently by 1710,³ which, if the signature attribution is correct and the repeating mechanism original, establishes minute repeating in Tompion's lifetime and raises the possibility that this triumph of baroque watchmaking was known to its greatest exponent.

INCONTROVERTIBLE EVIDENCE

In March and June 2009 a watch, signed 'B Fürstenfeldr fecit', appeared in Geneva and Paris auctions, described as a quarter repeater.⁴ The

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1. Sebastian Whitestone, 'A Minute Repeating Watch Circa 1715 Friedberg's Ingenuity in a Biased Market', *Antiquarian Horology*, 21/ 2 (Winter 1993), 145-157.
2. Norbert Enders, 'Anmerkungen des Übersetzers', *Uhren* 17/4 (1994), 23-24. Enders points out that C.F. Vogel's *Practischer Unterricht von Taschenuhren* (Leipzig, 1774) thoroughly covers watch repeating, including quarter and half-quarter repeating, with no mention of minute repeating. His other objections are rebutted by this author in *Uhren* 17/4, 24-25.
3. Adelheid Riolini-Unger, *Friedberger Uhren* (Friedberg 1993), p. 163. The parish records of Friedberg contain many references to Benedikt Fürstenfelder from 1710 onward, leaving no doubt that he had permanently left Aichach by that time.
4. Antiquorum Auctions, Geneva, Lot 321, (29.3.2009), Chayette & Cheval, Paris, Lot 87, (22.6.2009). In both catalogues the watch is dated circa 1730 which, in this author's view, is at the very end of a stretched forty year possibility.



Fig. 1. Pocket watch by Benedikt Fürstenfelder, with pierced gold outer case with cornelian panels. Overall diameter 47mm. Note the additional narrow minute chapter numbered 1-14 four times. Photos courtesy of Antiquorum S.A.



Fig. 2. The top plate of the Fürstenfelder with balance cock pierced in early eighteenth-century style. Photo courtesy of Mick Krening.

watch has a gold outer case set with cornelian panels between pierced interlaced scrolls. The verge movement is typical of continental watches made in the first half of the eighteenth century. The absence of C scroll borders on the case decoration, the piercing of the balance cock foot and the angular rigidity of the interlaced

strap-work are all early features that suggest the watch was made in the first quarter of the eighteenth century. In fact there is no decorative or mechanical element which precludes a date of manufacture at the beginning of that century or the end of the preceding one. With much of its repeating work missing, the watch would appear to be an unlikely candidate for pre-eminence in the history of that mechanism. However, it has a unique gold *champlevé* dial where each minute is numbered 1-14 four times in a narrow chapter between the conventional outer minute circle and the inner hour circle. The 15th minute is marked with a star at the hour and 1-3 at the relevant quarter. This calibration has only one explanation: it shows the actual hammer blows of minute repeating. Since gold *champlevé* dials of this intricacy are impossible to fake convincingly and were soon out of fashion, there can be no doubt that this watch was originally designed and made as a minute repeater during, or just before, the first quarter of the eighteenth century. Fortunately, traces of the minute repeating remain. Any notion that those traces could be later additions is dismissed



Fig. 3. The silver minute repeater signed, 'Marquich London'.



Fig. 4. The silver outer-case of the Marquich.

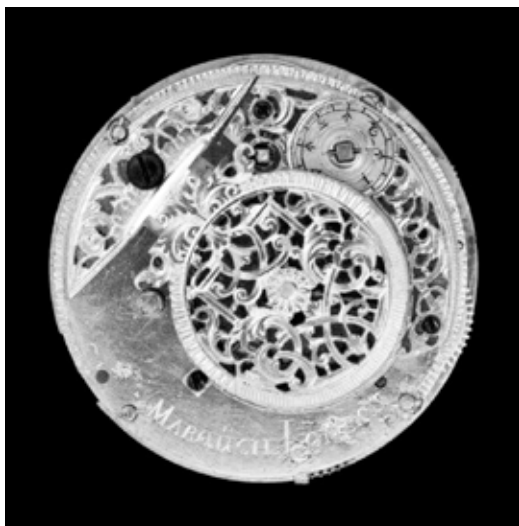


Fig. 5. The top plate of the Marquich.

by its unique dial. Bearing the original signature of Benedikt Fürstenfelder and containing traces of the otherwise unique repeating system found in the Marquich, the watch corroborates the attribution of the Marquich watch and, with its four relatives,⁵ validates the proposition that, throughout the first half of the eighteenth century, minute repeating watches were the monopoly of Friedberg.

THE REPEATING MECHANISM

In spite of the lack of much of the Fürstenfelder repeating mechanism, enough of it is left to be certain that it repeated the minutes. It may be seen that it originally contained the unusual feature of a single cam minute snail revolving every fifteen minutes (geared 4:1 with the hour

5. Apart from the Marquich watch, the other three Friedberg minute repeaters are: (1) A small table clock also by Fürstenfelder (private collection, formerly in The Time Museum, Rockford, Illinois); the mechanism is the size of those found in large coach watches. (2) A watch movement signed 'Lekceh, London' which is a known signature of Johann Heckel of Friedberg; (private collection, illustrated in A. Chapiro, 'Montres Primitives Avec Répétition A Minutes', *ANCAHA Bulletin* 1988, 21). (3) A silver striking coach watch signed 'Andreas Pfab, Dresden' (private collection, illustrated in Karl Langer, 'Die Erste Minutenrepetition', *Uhren* 1989, 26) which is very much in the Friedberg style and probably made there and retailed in Dresden. Pfab was not known as a watchmaker. Enders (see note 2) suggests the Pfab could be Swiss on account of the Swiss enamel dial but this ignores the fact that watches of all nationalities came with Swiss enamelling since the days of Heaud. Enamelling was an imported element at the time. Heckel died in 1743, Fürstenfelder in 1754 and Pfab in 1755, around the beginning of Ellicott and Mudge minute repeating, and showing that we are dealing with a different generation. The above four examples are fully described in the author's previous article (note 1).

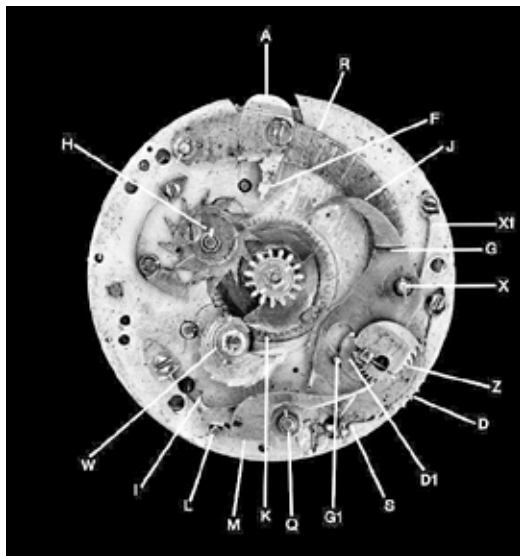


Fig. 6. The Marqüch minute repeating work.

wheel), just as the Marqüch watch has, the only other known example. Comparison with the repeating work of the Marqüch shows clearly how the Fürstenfelder repeating was set out and what is missing. The Marqüch operates as follows (Fig. 6): The pendant pushes at **A** on the repeating rack **R**, which has a chain attached to the end. The other end of the chain is wound around a pulley on the arbour of the repeating spring situated under the hour rack wheel **D** between the plates, and in now unwinding, winds the repeating spring. The rack **R** moves until the pin **F** meets the hour snail **H** and the hour rack-wheel turns, moving the correct number of its teeth past a loose pallet on the hammer arbour. The quarter rack **G** is situated above the hour rack-wheel **D** (which is between the plates) and is pivoted at **X** and under tension from a spring **XI**. As the hour rack rotates, a cam **D1** on its arbour is turned away from a pin **G1** on the quarter rack, to fall until the tongue **J** hits the quarter snail **K**. The minute rack **M**, is, like the quarter rack, 'broken' i.e. it is in two parts pivoted at **Q**. Because it is also jointed just above **Q** it jack knifes when the tail is no longer locking the cam **Z**. This happens when the cam is turned anticlockwise with the hour rack-wheel as the repeating spring is wound. The tongue **I** falls on to one of the fourteen steps of the minute snail **W**. The repeating spring is now fully wound and the watch ready to repeat. The teeth on the hour rack-wheel now return (clockwise), each

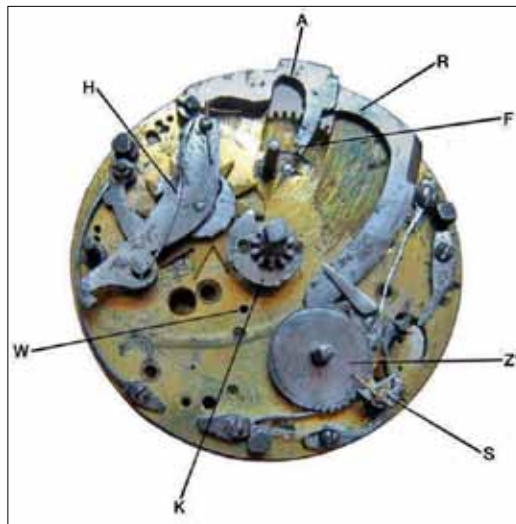


Fig. 7. The remains of the Fürstenfelder minute repeating work. Photo courtesy of Mick Krening.

one moving the hammer arbour via its one way pallet **S**. After the hours come the quarters, with double strokes made by the tail of the quarter rack on the same hammer arbour and pallet **S**. Lastly, the minutes are struck by the minute rack-wheel set above the hour rack-wheel and under the minute cam **Z**. The number of minutes is governed by the level at which the minute rack tail engages the returning minute cam **Z**. Whichever step of the 14 on the cam meets the rack tail, it will straighten the rack, lifting the tongue **I** off the minute snail and bringing the rack back against the pin **L**. At this point the rack is rigid again, the tail still locked in the cam **Z** which now cannot revolve anymore. Thus the whole train is stopped. There is no 'all or nothing' piece.

The mechanism of the Fürstenfelder had a very similar layout and operated in the same manner (Fig. 7). The one difference is that it has an 'all or nothing' piece above the hour snail and star wheel. The repeating rack **R** is pushed at **A** till the pin **F** meets the hour snail **H**. Although the hour wheel, quarter rack, minute snail and minute rack are missing, the minute snail pivot hole may be seen at **W**. The original steel minute rack-wheel survives with 14 teeth at **Z1** (in the Marqüch diagram this wheel is unmarked but just visible between **Z** and **D**, above the plate). The one way hammer pallet may be seen at **S**. The steel hour rack-wheel survives and is hidden between the plates. The quarter snail is seen at **K**.

THE MAKER

Benedikt Fürstenfelder was born in Aichach on 2 January 1680. On 8 August 1707 he married Magdalena Gastl von Laimering and had two children before moving to Friedberg. He appears in the Friedberg parish registers from 1710, having a further thirteen children in the following fifteen years with a second wife, Helene. He died in Friedberg in 1754 as senator of their Higher Council. Two of his sons, Johannes and Matthias Benedikt, became watchmakers. Apart from the Marquich watch there is a large silver coach watch bearing Fürstenfelder's Aichach signature, which is illustrated in the first article mentioned above. There is a table clock and a pocket watch in the Victorian & Albert Museum, London and a hexagonal table clock in the Poldi Pezzoli, Milan. A palatial Chinese lacquer clock with matching table containing a movement by him was made for the Residenz in Munich and is now in the Bayerisches Nationalmuseum. A small hexagonal table clock with minute repeating is illustrated in Alan Lloyd who gave it an erroneous date and place of manufacture, confusing Friedberg with Freiberg in Saxony.⁶ This mechanism was mentioned in Wadsworth's comprehensive review of repeating watches but he doubted it could have worked in a watch.⁷ In this clock Fürstenfelder uses the conventional four cam minute snail. From surviving material it would seem most likely that Fürstenfelder's main speciality, like that of his fellow watchmakers in Friedberg, was coach watches in fine silver or silver gilt repoussé cases. A number of these watches struck the quarter hour as well as having repeating and alarm. These coach watches were retailed by other makers all over Europe and especially in Paris, Dresden, Vienna and Prague. Unlike many of his confreres, it would seem from his surviving work that Fürstenfelder was above the practice of disguising his name or engraving it next to a false place of manufacture. In the case of the Marquich watch the original signature was later altered. However Joseph Spiegel signed himself both 'Legeips, London'

and 'Miroir, Paris'. Other likely aliases were: 'Strigner, London' for Jakob Strixner, 'Ysorb' for Johann Paul Brosy and 'Renpaurg, London' for Paul Gottfried Graupner. These signatures are not re-engravings and were no doubt done at the behest of travelling watch sellers of the type mentioned by Leutmann who warns us that such people carry 'London' watches that 'have never seen London'.⁸

THE NEED FOR MINUTE REPEATING

The main reason why Friedberg developed a particular expertise in watch repeating mechanisms may have been its speciality of coach watch manufacture. These 'Kutschenuhren' were placed in a special receptacle in coaches and were normally fitted with quarter repeating. One can imagine the difficulty of reading a watch dial in a dimly lit, shaking coach where bored minds frequently turned to the journey time. However, watch repeating wasn't invented in Germany but in England and France. It seems likely that it was independently invented by Quare and Barlow in London and also by Gloria in Rouen, around 1686.⁹ These watches were clearly derived from the clocks that were carried to the bedside at night and whose cords, when pulled, gave the time to the nearest quarter without the need to light a candle. Presumably the repeating watch fulfilled the same function at night as the bedside clock. One can only speculate as to whether, during the day, repeating was used more for display than for necessity. But even the latter use can scarcely have required further refinement to indicate minutes, unless it included the timing of shorts periods in which some special action had to be contained. Normal activity, however, was synchronised to medium-sized divisions of the solar day and not fine divisions of a mean hour. The need, if there was one, for minute repeating is very likely to have come from the challenge that it presented to watchmakers. This challenge may have been religious as well as technical. In Catholic Friedberg as elsewhere, labour was considered a form of religious devotion and supererogatory works, or those

6. H. Alan Lloyd, *Some Outstanding Clocks over 700 Years* (London, 1958), p. 100.

7. Francis Wadsworth, 'A History of Repeating Watches', *Antiquarian Horology* 4/12 (September 1965) to 5/3 (June 1966).

8. J. Leutmann, *Vollständiger Nachricht von den Uhren* (Magdeburg 1717 and 1772), p. 85.

9. A. Chapiro, 'Les Oignons Louis XIV', *Interchron Journal* 1 (Paris 1980), 46-48.

that exceeded requirements, were twice blessed. But whatever the challenge, once it had been met and the first minute repeater performed to an audience, then no doubt it resonated in an acquisitive and competitive market that loved novelty and theatrics. And what a sensation it must have caused with its maximum (assuming a single blow at the quarter) of twenty nine strikes of the bell instead of just fifteen for a normal quarter repeater.

HISTORY REPEATS ITSELF

This is the second time that this journal has pushed back the introduction of minute repeating by nearly half a century, on each occasion rescuing existing examples from obloquy. Illustrated on the front cover of this journal for December 1961 was a photograph of a large minute repeating clock-watch by Thomas Mudge, No. 407, then belonging to the dealer Malcolm Gardiner. Unaware of other Mudge minute repeaters, leading horologists of that time condemned the minute repeating work as a later addition. This extraordinary view prevailed for nine years. Then, on a hot summer's day in 1970, the collector Cecil (Sam) Clutton, possibly aided by a thinning of watch oil in the warm temperatures, finally persuaded the Duke of Wellington's Mudge, No 318 to repeat, which in living memory it had refused to do. To his and the duke's surprise it repeated the minutes; a fact duly reported in this journal when Mudge 407 was finally exonerated and Mudge 318 accorded the distinction of being the earliest known minute repeater.¹⁰ Most readers nowadays, even without the benefit of hindsight, may well consider it inconceivable that any watch could be later modified or upgraded to minute repeating.

There would be insufficient room and, even were it to be possible, insufficient reward for the considerable work involved. However, it is not only the mechanism itself but also the historical references to it that have received implausible interpretation. Minute repeating was mentioned by Derham¹¹ in 1696 and by Thiout¹² in 1741. Both texts were taken to refer to hypothetical and not actual mechanisms. In the case of the Thiout reference, this interpretation was derived from a mistranslation of the original French.¹³ However, from then on it was sustained by a singular implausibility, i.e. that Thiout would attempt to describe and illustrate in detail a mechanical refinement that never existed.¹⁴

MINUTE REPEATING IN ENGLAND

The mention of Minute repeating in Derham was only of a sub classification of repeating in general. This sub classification presumably included half quarter repeating and ten minute repeating, although surviving seventeenth-century examples of both these systems are extremely rare. This scarce legacy may not reflect their true number three hundred years ago. Perhaps Derham was alluding only to ten minute repeating. However it must surely be right to keep an open mind as to whether minute repeating already existed in 1696. The receding date put on its introduction well illustrates the perils in mechanical history of deriving too rigid a notion of what might have existed from what remains. Nothing is more expendable than that which ceases to function nor more vulnerable than a mechanism deprived of the protection of its precious metal case. In that double jeopardy for the pocket watch, the minute repeater is additionally at risk if we assume that, the more complicated the design,

10. Cecil Clutton, Letter, *Antiquarian Horology* 7/1 (December 1970), 72.

11. William Derham, *The Artificial Clockmaker* (London, 1696), p. 106: 'The clocks [ie timekeepers; clocks or watches] I shall now speake of are such as by pulling of a string etc do strike the hour, quarter or minute at any time of the day or night'.

12. Antoine Thiout, *Traité de l'Horlogerie, Mécanique et Pratique* (Paris, 1741), p. 365: 'Although watches have been made on this principle [ie minute repeaters] and no doubt not dissimilar to this design.....'. The design to which Thiout refers is a detailed illustration possibly derived from a verbal description or rough sketch of a minute repeating mechanism with 'all or nothing' piece and four cam minute snail.

13. Wadsworth (see note 7) states that minute repeating watches 'were not made before about 1750', (page 365), misinterpreting Thiout, as argued earlier by the present author (see note 1).

14. Arnt Simon, 'A Pre-1750 Minute Repeater', *Antiquarian Horology* 19/5 (Autumn 1991), 525. Simon describes a minute repeater by Ellicott which he dates to 1747. With regard to Thiout's reference he concludes that minute repeating watches 'obviously had not been made at that time...'.
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the more likely it is to fail. Tompion becomes relevant here because we know more about his manufacture than that of any other watchmaker of the time. His posthumous celebrity ensured that his watches had a relatively high survival rate but even so that is probably less than 10 percent on an estimated production of over six thousand.¹⁵ How certain can we be that among more than five thousand missing Tompion watches there is not a minute repeater? The survival rate of other makers such as Quare may be as little 2 per cent which is hardly sufficient evidence upon which to exclude the possibility of his making minute repeating. When considering minute repeating as a possibly English innovation one has to take into account not only that it was first mentioned in England but also that, unlike London makers at

the end of the seventeenth century, Friedberg's craftsmen seemed to be imitating rather than inventing. Five known German examples compared to none anywhere else before the middle of the century would seem to suggest an extraordinarily long lasting monopoly. This is all the more remarkable given Friedberg's provincial setting and the baroque appetite for virtuosity and sensation. But was Friedberg's original inspiration a Tompion, Quare or Barlow, or was it, as his distinctive dial and mechanism suggest, a young maker from up the road who dared to outdo them?

ACKNOWLEDGMENT

I wish to thank Simon Bull from whose peerless eye the Fürstenfelder finally failed to hide.

15. Jeremy Evans, *Thomas Tompion at the Dial and Three Crowns* (Wadhurst 2006). Evans' checklist contains some six hundred Tompion watches and he has suggested that total production of watches was probably well over six thousand.