



# British Horology Times

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British Horology Chapter 159 of the National Association of Watch and Clock Collectors

## NINE DAY FRANKLIN STYLE TIMEPIECE

by ROGER GENDRON

Photos courtesy of Nancy Gendron Hofmann

I had been intrigued by the Franklin style timepiece since I first learned of them in the early 1970s. I finally got around to designing and building my version in the 1990s. It is a 9-day Franklin style movement with passing strike, built in maintaining power, a counterbalance hand and all movement pivots rotating in stainless steel instrument bearings. (The weight pulley has a stainless steel needle bearing.) I wanted to use as many wheels, pinions, bearings and as much brass and steel from my stock as possible. It only required the addition of two large wheels, a 20 tooth pinion and a few ball bearings. The dial does not show seconds. There is a 32 tooth escape wheel and a pendulum beat of slightly more than one second. (An indefinite number: 1.00446428571 is the beginning.) The ratio of the center wheel to the escape wheel is 1:224.

I did not want the running time limitations of Franklin's pull up winding so I decided on an eight day movement. There was room for a longer winding barrel so I went to a nine day running time. A very low recoil escapement anchor encompasses 10-1/2 teeth of the escape wheel for a small pendulum arc. The anchor is made of oil hardening tool steel with only the pallets hardened. All movement parts are polished and all non contact surfaces lacquered. I decided on a right hand spiral for the dial rather than Franklin's left hand spiral.

The clock was originally meant for my kid brother, but he died of cancer before the movement was finished. The quarter sawn oak case was finally designed in 2009 and finished early this year, 2011.

### BENJAMIN FRANKLIN'S CLOCK

A three (3) wheel, two (2) pinion clock that would display the hours, minutes and seconds was designed by Benjamin Franklin in 1756 or 1757 during a lengthy visit to Britain. Franklin conveyed his design to his friend, the astronomer and mathematician James Ferguson of Edinburgh who published it in his book *Select Mechanical Exercises*. Ferguson wrote this about the design:



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Chapter 159



**Our Next Meeting**



Will take place at the Mid Winter Regional  
in Daytona Beach Florida  
Friday, February 10, 2012 at 3pm.



David Grace is going to give the presenta-  
tion, titled: "English Marine Chronometry:  
Is it Time to Stop Rehashing Gould's Book  
and Rethink the Story?"



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Dennis Radage as  
he presents a pro-  
gram at the Na-  
tional Convention  
last June in Kan-  
sas.



## President's Message:

Our 2012 program is coming together nicely and I'm pleased to announce that David Grace will be presenting our first lecture of the year at the Mid Winter Regional in February on the influence of America on English chronometry, titled: "English Marine Chronometry: Is it Time to Stop Rehashing Gould's Book and Rethink the Story?". More information is provided in this issue. Please grab an interesting clock, watch or movement and bring it for our show-and-tell portion of the meeting.

I also want to take this opportunity to promote our web site. It can be found under the Member Central section on the NAWCC home page (NAWCC.ORG) and has a wealth of information about the chapter including upcoming meetings, chapter news and an archive of past British Horology Times. Special thanks goes to Frank Del Greco who worked with Kevin Osborne at headquarters to scan and publish about twenty of our earliest publications that were missing from the website. If you have not checked out the site recently, I would highly recommend doing so and taking advantage of the BHT archive. The content of these added early publications are excellent as you would expect, and I have to admit smiling upon reading that our dues and membership level have remained remarkably consistent for nearly 20 years!

Speaking of dues, a reminder was enclosed in this issue for all memberships expiring at the end of this year. Please help support the chapter and keep expenses to a minimum by renewing your membership as soon as possible.

Lastly, a huge thanks to Dennis Radage who gave a very thorough and well received presentation on early English watches at our last meeting that was held at the National Convention in KC.

Rich

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## Editor's Corner:

Were you as excited as I was to see our newsletter articles so abundantly featured in the August issue of the NAWCC Bulletin? Chapter 159 was chosen to introduce a new feature titled Mosaic, which reprints articles from chapter newsletters. No less than three of ours were used. Authors were Dennis Radage, Richard Newman and Frank Del Greco. All were so interesting, I had to re-read them.

Speaking of which, Rich's recent story titled "It Pays to be Caught in the Rain" led to my purchase of a book on Sundial mottoes. That in turn led to my delight in receiving a sundial from a friend's garden. The story is not over, however. My friend and I have now embarked upon a project. We are making our own vertical sundials. Since we are pen pals who only see each other a half dozen times a year, we collect, copy and mail plans and ideas back and forth. It has been great fun. The project is now down to the actual design and construction phase. It is also a lesson in patience since our correspondence usually spans a week between letters. We have kept the size of the sundials to 12" x 15" this time around, but who knows, once we get experienced, the sky's the limit. We also plan on presenting a short 'show and tell' to our local chapter at a future meeting.

If that were not enough, I am also enrolled in a machining class for the next 12 weeks. There are 7 fellows and me. Luckily there are 7 lathes in the classroom. Alas, not as many milling machines. We are encouraged to bring in projects to work on in class. I want to mill a clock weight and a hold down tool for small projects. Wish me luck. I am the only student without blueprint reading experience.

Deena

## Two Interesting English Sundials

*Frank Del Greco (OH)*

Recent issues of BHT have mentioned sundials. I saw two interesting sundials in England that I thought I would share.

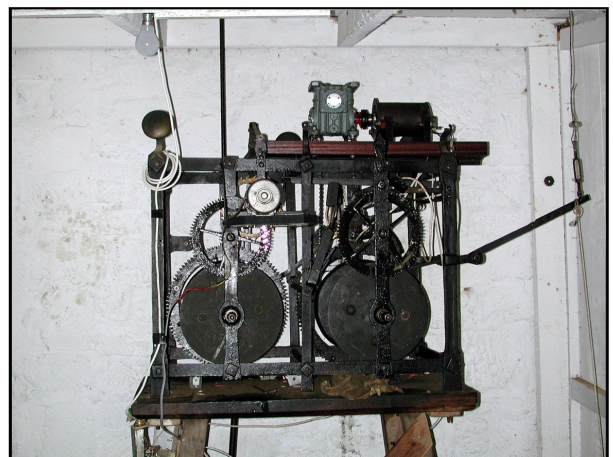
The first is a wall-mounted sundial on the back side of St. Etheldreda's church in Horley. Horley is a civil parish north of Oxfordshire about three miles northwest of Banbury. St. Etheldreda's church was built in the 12<sup>th</sup> century. Inside the church is a painting of St. Christopher dated 1450. I was actually there to look at the church's turret clock, a two-train birdcage style clock with a homemade rewind system using a direct drive DC motor. The church, sundial, and the turret clock (hey, I'm a turret clock enthusiast and was looking for a reason to show one!) are shown below.

The other unusual sundial is on a post in front of St. Thomas' church in Wimbourne Minster. Wimbourne Minster is a market town in the East Dorset district of Dorset. The building began as a nunnery in 705AD; the church was built in 1120 and added onto in 1464. Again, I came to see the turret clock, which was unusual because the dial had mechanical soldiers, called jacks, that pivoted out on the quarter hours and struck bells.

The sundial on the post is unusual because it is three-sided. I'm not really sure how well that works in practice but it is interesting. I've included photos of the clock and dial of St. Thomas' church because, well, you know why!



*St. Etheldreda's Church in Horley*



*St. Etheldreda's Two-Train Birdcage Clock*



*Three-Sided Sundial at St. Thomas' Church*



*St. Thomas' Church in Wimborne Minster*



*St. Thomas' Three-Train Clock, ca. 1743*

# Seventy Years of Neglect!

By Dennis Radage

Having previously discussed clock neglect and the need for regular service, both cleaning and re-lubrication, I now find myself with a clock that the owner claims has a special position in her life, a family heirloom that was presented to her grandfather back in 1879. She now wants the clock brought back into the condition (movement and case) that it would have been on “presentation day”. This is a French ebonized mantle clock with applied gilt brass mounts to the front and sides, Figure 1. There is a silvered presentation plaque attached to the front of the case. The owner however says that this clock has been stored and has not been functional for some seventy years!

The case was in reasonable condition given its seventy year storage. A little cleaning and care would see the case shine. The gilt mounts must be removed, carefully cleaned and lacquered. The presentation plaque, which was oxidized black, would need re-silvering and lacquering.

The movement type was new for me. This was a skeletonized movement with Brocot escapement, through the dial, 8 day time only. The mainspring was large for the clock and attached in a brass barrel to the back of the rear plate.

Examination of the movement quickly confirmed that it had not been touched for decades. It was so dirty and oxidized that it was difficult to determine what it was made of. Of course however, it was a brass movement. The entire movement was oxidized and covered in some form of dust that was strongly adhering to all brass components Figures 2 and 3.

Dismantling and cleaning revealed a bright brass movement, Figure 4. Unfortunately there was extensive damage that could only have been caused by abuse, likely by an amateur some 70 or more years ago. The escape wheel teeth were bent, figure 5, as were the teeth on the center wheel, one tooth was broken. A Brocot pallet was broken, both pivots on the pallet arbor were broken as was the front plate escape arbor pivot, Figure 6. While the pendulum was there, the bob had been lost.

I find it quite amazing that a clock that is considered a family heirloom should be in such a condition. However, considering the challenge and apparent importance of the clock, the restoration project was accepted.



Figure 1

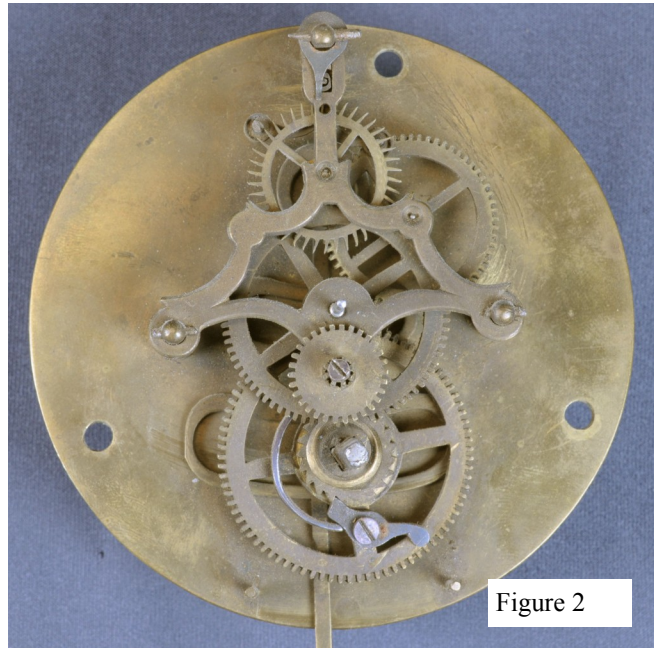


Figure 2

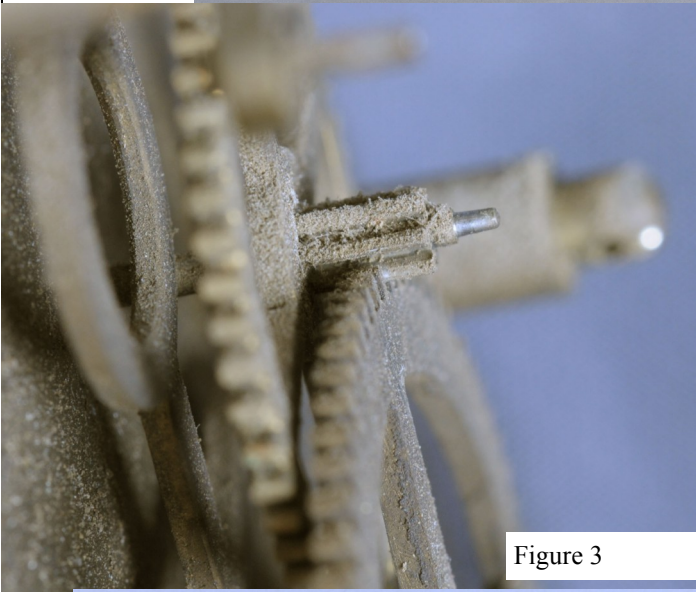


Figure 3



Figure 4

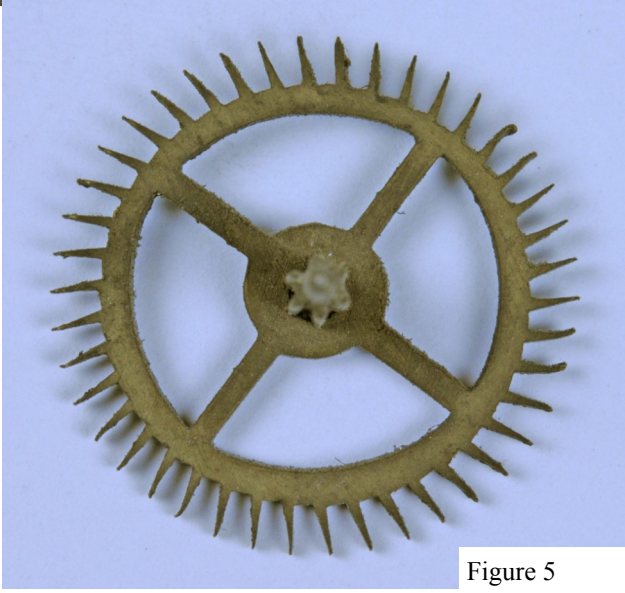


Figure 5

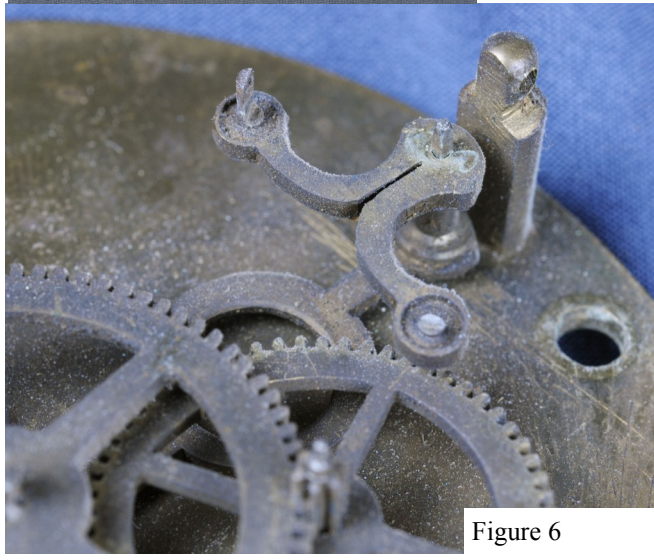


Figure 6

“The clock is not designed to be wound up by a winch, but to be drawn up like a clock that goes only thirty hours. For this purpose the line must go over the pulley on the axis of the great wheel, as in a common thirty hour clock. Several clocks have been made according to this ingenious plan of the doctor’s and I can affirm that I have seen one of them, which measures time exceedingly well. The simpler that any machine is, the better it will be allowed to be by every man of science.”

With no strike work, the clock would run as long as four days, perhaps longer between windings, depending on case height or height above the floor.

Until a few years ago, I did not believe that any contemporary Franklin movements had survived. Now I have seen two in the Clockmakers’ Company Museum in London, and there is one by Whitehurst in the Derby Museum. Many modern versions have been made including one I saw in the clock workshop at BHI headquarters. During the 1970s an English firm was offering a replica in an English longcase.

### **BENJAMIN FRANKLIN’S CLOCK** **READING THE TIME AND OPERATION**

Although the movement is quite simple, reading the time is not. The lower outer circle in Figure 1 is divided into quadrants. Each quadrant is divided into sixty (60) minutes. The hand *A* makes one revolution in four (4) hours. The hours are engraved in the spaces on the spiral. The small hand *B* in the arch on the top makes one revolution in one (1) minute and is marked for seconds. Thus the time that appears on Figure 1 is 12:32:28 or 4:32:28 or 8:32:28. Franklin’s idea was that the person desiring the time would not be four hours off in estimating it and therefore the correct time could be ascertained.

Figure 2 shows the wheel work of the movement. The great wheel *A* revolves once in four (4) hours and has 160 teeth. The great wheel drives pinion *B* with 10 leaves so *B* makes one revolution in one sixteenth of four hours or fifteen minutes. Of the arbor of pinion *B* is wheel *C* with 120 teeth. Wheel *C* revolving once in fifteen (15) minutes drives pinion *D* with 8 leaves. Pinion *D* revolves once in one minute. On the arbor of pinion *D* is the escape wheel *E* with 30 teeth. *E* drives a one second pendulum through a standard anchor and crutch

This was a very clever concept, but one that never became popular.

Figure 1, below, reading the time and operation of Benjamin Franklin’s clock

Figure 2, below right, shows wheel work of the movement.

