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Paul Odendahl
Editor & Publisher

British Horology Times

NAWCC CHAPTER 159

News FROM CHAPTER 159

A happy belated new year to all! We are already two months into 2004 and have had our first meeting in Orlando.

Our roster currently stands at 121 members.

This is an election year for our chapter. We have been assembling a slate of officer candidates to serve for the next three years. The following members have been nominated as candidates for officers:

For President, Roger Gendron (MI)

For Vice-President, Lee Yelvington (NC).

For Secretary, Ken Johnton (NC)

For Treasurer, David Kern (NY)

We will vote on these candidates and any others who are nominated by the membership or who volunteer themselves between now and July at our annual meeting at the national convention (this year in Oklahoma City OK).

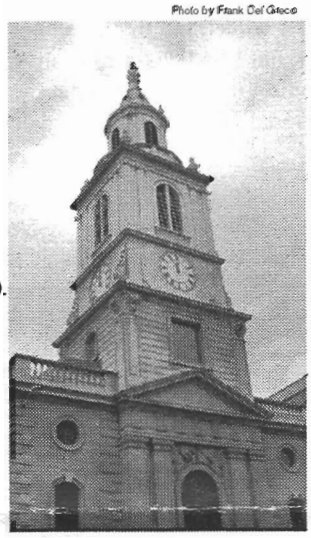
Our next meeting will be at the Southern Ohio Regional in Fort Mitchell KY on Friday, April 16, 2004

It has been a pleasure serving you as president of Chapter 159. I plan to continue to be an active member and ensure that the transition to the new officers goes smoothly.

We continue to need articles for upcoming newsletters. Please consider submission of articles to the newsletter editor Paul Odendahl, 975 Topaz St., New Orleans LA 70124.

-Frank Del Greco

Photo by Frank Del Greco



Saint Botolph's Without, Bishopsgate in London

You will find more about Miss Muffet on page 6.

Editor's Corner

Life is wonderful and no spider is going to work his powers of intimidation on any member of Chapter 159.

Little Miss Muffet
Sat on a tuffet,
Eating her curds and whey.
Along came a spider
Who sat down beside her
And frightened Miss Muffet away.

Imagine that you are Miss Muffet. And let's say "eating your curds and whey" means "writing your article for publication in BHT" about that special clock you pursued and finally got, or how you fixed that cranky movement, or the watch that everybody else wanted, or how my wife/husband got hooked on horology and what I'm doing about it.

We're lucky. There are over a hundred of us in Chapter 159 and we're spread around the globe. That means you have over a hundred like-minded friends, so if a Canadian member feels the need to shoo away a spider he can ask for help. The same with Scotland. Or Arizona.

No leering spider is going to get away with it if he tries to cast a spell on a helpful member by numbing the fingers, by telling the brain "I can't remember", by hanging up a big red sign saying "I DON'T HAVE TIME", or by any of his sordid tricks designed to postpone the fun of having yourself published.

Start writing now and watch the spider fade away.

Life is beautiful.

-Paul Odendahl

STRIKING TRAIN PINIONS OF REPORT

Roger Gendron (Michigan) takes us though the calculations for making this strike side pinion which could possibly get lost.

Photographs by Roger Gendron

***A note to the reader**: Some of you, already skilled in the repair of movements, will find some of my definitions tedious. You probably know how to do this procedure. The definitions are to assist those not so skilled.*

Something came to my attention at the 2003 Southern Ohio Regional in Ft. Mitchell, Kentucky that had escaped my prior notice. I learned how frequently the striking train pinions of report are lost and otherwise complete movements need to have new pinions made as replacements. Although some early movements had the pinion cut in the large round end of the pin wheel arbor that extended through the rear plate (or the rear bar in the case of a posted frame movement), for the most part the pinions had a square hole that was a slip fit on a squared off portion of the pin wheel arbor that extended beyond the rear plate (or rear bar). If the count wheel/locking plate is removed, the pinion can fall off. It wasn't something that I had not seen, but I had never paid any attention to it. A member at the Regional requested help in calculating the number of teeth the pinion required and the request eventually got to me. That prompted this article as the arithmetic is rather straightforward, once a simple set of rules are applied.

The key to the number of teeth for the pinion requires first, the number of pins on the pin or main wheel for the hour strike of the striking train. All of the pin wheels that I have personally worked with had either twelve or thirteen pins. A search of the literature showed me that during the last third of the seventeenth century and during the eighteenth century the number of pins ranged from as few as eight to as many as sixteen. However, the most common number was thirteen with twelve the second most common. Numbers actually found included 8, 10, 12, 13, 14, 15 and 16. Although the

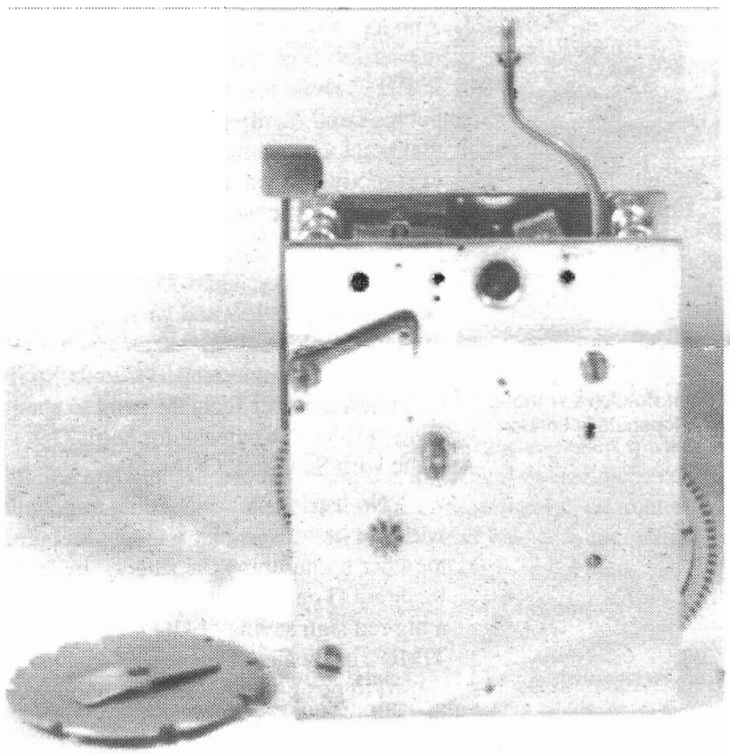


Fig. 1. Rear plate of example with count wheel/locking plate removed; pinion of report in place.

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Editor: PAUL ODENDAHL

All correspondence, manuscripts and applications for membership should be sent to Frank DelGreco 13730 Braeburn Lane, Novelty OH 44072-9586, USA. e-mail: fdelgreco@aol.com

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calculations are the same, I will restrict this article to trains with twelve and thirteen pins. I will also restrict this article to count wheels that make one revolution in twelve hours. If anyone has a different pin count or a count wheel that makes one revolution in twenty-four hours and has trouble with the calculations, contact me through the editor and I will assist.

As a point of general information, not necessary for the calculations, but helpful in understanding the train: The number of teeth in the pin wheel will always be a multiple of the number of pins. With twelve pins, the most common number of teeth is 72, but 60, 84 and 96 teeth, though rare, are possible. With thirteen pins, I have personally seen only 78 teeth, never 65, 91 or 104.

With normal striking there are seventy eight hour strike blows in twelve hours. Now starts the rather simple arithmetic. A twelve pin wheel requires 78/12 or 6½ turns of the wheel to activate the strike hammer seventy eight times. Therefore the ratio between the pin wheel and the count wheel that makes one revolution in twelve hours is 6½ to 1.

After the middle of the eighteenth century, a common number of teeth for a count wheel with a pin wheel with twelve pins was 65. (Before the middle of the eighteenth century, a common number of count wheel teeth was 39.) With 65 teeth in the count wheel and twelve pins, the pinion of report would have 65/6½ or 10 teeth. With 39 teeth in the count wheel. The pinion of report would have 39/6½ or 6 teeth. It is that simple.

With a pin wheel with thirteen pins, it would require only six turns of the pin wheel to activate the strike hammer seventy eight times. Common count wheel tooth counts for thirteen pin wheels through the eighteenth century were 48, 54, 60 and 78 teeth. With 48 teeth in the count wheel and thirteen pins, the pinon of report would have 48/6 or 8 teeth. With 54 teeth and thirteen pins, the pinion of report would have 54/6 or 9 teeth. With 60 teeth and thirteen pins, the pinion of report would have 60/6 or 10 teeth. With 78 teeth and thirteen pins, the pinion of report would have 78/6 or 13 teeth.

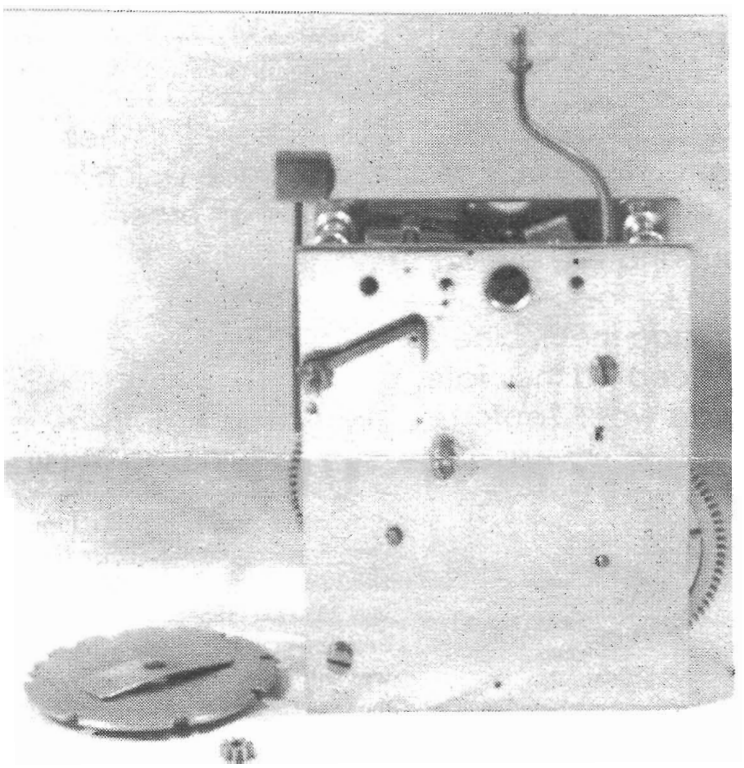

Fig. 2. Rear plate of example with count wheel/locking plate and pinion of report removed.

All that remains is to determine the dimensions of the pinion. To familiarize yourself with the principles, I recommend that you read my article on *Pivot Hole Centers* in the August 2001 issue of the NAWCC Bulletin. It does show the methods for measuring the outside diameter of wheels with even and odd numbers of teeth. That measurement is the first thing that has to be done. (The article will also be helpful if the pin wheel pivot hole is worn.) After determining the maximum outside diameter of the count wheel, the diametral pitch or **P*d*** can be determined by adding **2** to the number of teeth, **T**, in the wheel and dividing by the outside diameter, **O.D.** (**P*d* = T + 2/O.D.**). (The diametral pitch for the count wheel and the pinion of report is identical.) Now we can determine the pitch circle diameter, **D**, by dividing the number of teeth in the wheel by the diametral pitch (**D = T/P*d***). We can now determine the pitch circle diameter of the pinion of report or **D*p***. It is the pitch circle diameter of the count wheel multiplied by the ratio of the tooth counts where the tooth count on the pinion of report is represented by

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HENRY - Part 10

Abridged from *The First Henry*, copyright © by The Royal Archivists. Used with permission.

Paul Odendahl (LA) tells how Henry and Tom Tompion now embark on a new chapter in their lives after a skirmish in Whitehall Palace which left them each with a bag of gold and an order to get out and stay out of London for four years. They made the choice and accepted their fate. The date was 5 September 1666. Henry was 34 years of age. Tom was 28.

To be exiled from London for four years was not a hardship They were eager to enjoy themselves and to travel to new as well as familiar places. Early on, Henry made a strategic plan.

"I shall," he promised himself," place half of my bounty in safekeeping. It will be used at the proper time to begin my clockmaking career. The other half I shall use as suits my whim."

Tom didn't commit, but he thought this another of Henry's useful plans.

We shall respect the period of exile and not try to document it in detail. Except that we can say that places like Oxford, Abingdon, Bedford, and Buckingham had the pleasure of a visit by Henry and Tom.

The return to London on 30 January 1671 was quite different from that of their return from France on 2 September 1666. Henry was 38 years of age and Tom was 32. This time there was no excitement in the streets. Charles II was still searching for money — by the unusual means of converting to Catholicism, and he was still pursuing beautiful women; the Court was still carrying on devious intrigues; and the stout English people were still living, working and laughing as if this were the Lord's most favored country, which some think it was.

The very first place Henry and Tom headed for on 30 January 1671 was Mr East's premises. There Henry was surprised to find waiting for him a parcel — a royal parcel from France at that, addressed to Henry in large flowing calligraphy. The wrapping was replete with many notations and sealing wax in which was embedded a blue and white ribbon with a lead seal clamped to one end. The parcel was tied with a burnished leather thong.

Mr and Mrs East joined Tom to watch Henry perform the opening carefully saving all the wrappings, as if they were precious. He slowly lifted up an object which had another inner wrapping of vellum. Untying that he exposed a book. The cover was soft leather hand tooled with the words

HOROLOGIUM
Christiaan Huygens
1667

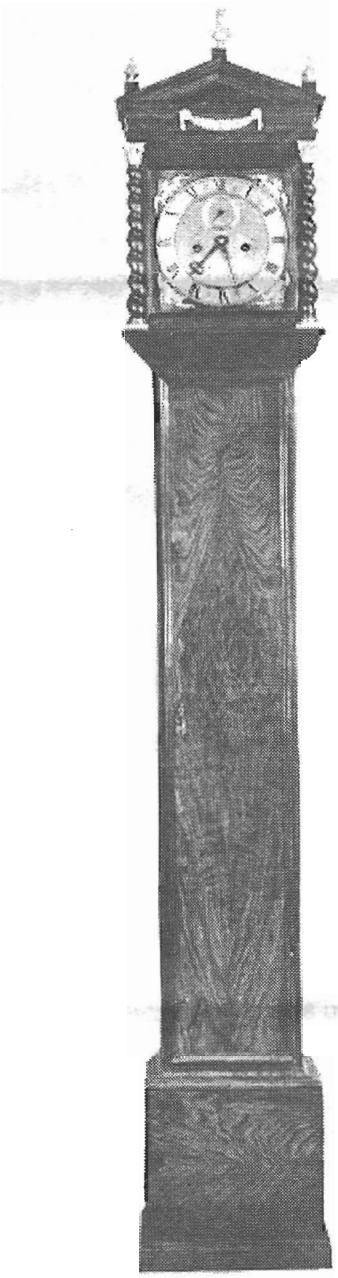
There was a red jewel surrounded by a circle of diamonds embedded on the cover. The edges of the pages were gilded and when Henry opened the cover, there on the first page was the inscription

To the Sun King
with Laud and Praise
M. de Z.

There was one thing more: a folded piece of light blue parchment on which were written the words, "It is our pleasure to give you this book in exchange for your boots. Louis"

Most of the day was spent with the Easts. They listened and the two travellers talked. Their return and departure at the time of the fire in 1666 was so hasty that they didn't have a chance to talk about their time in France. They did so now and the Easts couldn't believe their ears when they heard about the unrefined habits of the royal court:

"At table guests amused themselves by throwing bread or fruit at each other. Cleanliness was ignored and the early morning ablutions consisted of wiping one's face with a handkerchief. The needs of nature were often satisfied in public. Cleaning the teeth was done by sucking aromatic lozenges.



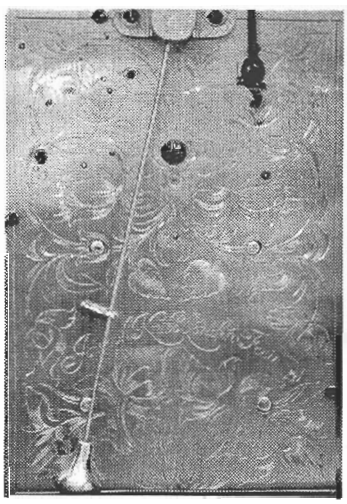
Longcase clock made by Henry in 1672.

Wealthy Londoners of the type that bought clocks.

Perfumes were used to neutralize bad smells but never water..."

Amongst those who were happily working in 1671 were London's clockmakers. Domestic clocks were a status symbol and those who could afford them, such as the nobility, land owners and merchants, were buying. Tom immediately became a brother of the Clockmakers' Company by paying a fee of 30 shillings. Henry, who had been free since 1663, began doing free lance work for Joseph Knibb, with whom they had spent time during the exile, and who had arrived in London in 1670 and had obtained his freedom. Joseph Norris, who had remained in London to complete his apprenticeship, was also free in 1670. The four men found enough work that could be sliced up between them.

Then in 1672 Henry set up shop and shared premises with George Petty. The following year he got into a dispute with Robert Seignor who had somehow got possession of a clock made by Henry and who had changed Henry's name. Two more contemporaries were granted freedom during this period: Daniel Quare in 1671 and Joseph Windmills in 1673.



A Knibb backplate from ca 1685.

All the while Thomas Tompion was still a brother. The problem was that Tom had not pursued an accepted period of apprenticeship under an accepted master. Tom knew that he was now a skilled clockmaker capable of producing the equal of any of the journeymen. Henry knew it. So did Edward East, and the Josephs Knibb and Norris. But there remained what we now call "red tape".

In 1674 a catalyst appeared in the form of Robert Hooke (age 39). Small and misshapen, and with a tendency to be irrascible, Hooke immediately recognized Tom's skill when he engaged Tom for the making of a quadrant. Together with East, Knibb, Norris and the ever helpful Henry, Hooke took a stand with the Clockmakers' Company in favor of Tom's freedom and in April 1674 Thomas Tompion was declared free upon redemption and paid a fee of 10 shillings. Now British Horology had been officially unleashed.

In September of the following year Tom established a new shop and called it "The Dial and Three Crowns" in a better location at Fleet Street and Water Lane. He had previously been further down on Water Lane. Henry set up a shop in Inner Temple Lane in 1675. Henry was now 43 years of age and Tom was 37.

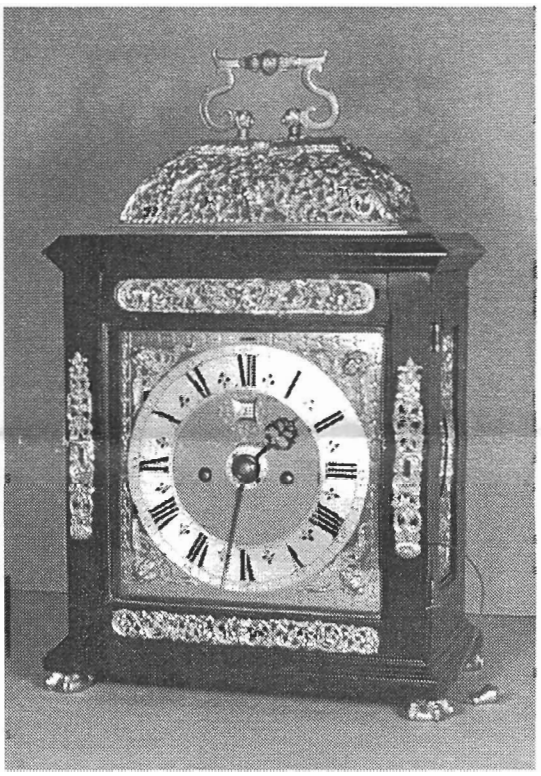
In 1675 Joseph Norris made a move. Since his freedom in 1670 he had operated a successful shop making and selling domestic clocks of high quality. He was close to both Tom and Henry and listened carefully to tales of their exploits abroad and in Britain. Perhaps he felt wanderlust. Perhaps he perceived the craft becoming crowded in London. One day he said to both of his friends:

"I shall be moving to Holland. I know I am taking a risk but both of you have done so and it has done you no harm. I believe Holland offers a fertile field for a good clockmaker and I will make my home there. Now I do not know what I will find there concerning materials and tools so I am asking you both to continue our present working relationship. It is possible that I may need parts or even a finished clock from you."

Henry and Tom gave their consent and that opened the gate for English bracket clocks to be sold in Holland.

Within the month there arrived in Henry's mail a request from Joseph Norris for an assortment of clock parts, some oil and a few tools. The next year, 1676, there were orders for more parts and two complete but unfinished bracket clocks. Joseph Norris was finding a market and was finishing bracket clocks in the English style. In his letters he told that he was also making longcase clocks. For the next 14 years a small but steady stream of English bracket clocks was moving to Joseph Norris in Holland.

Then came this:



The Knibb clock procured by Henry for Joseph Norris in 1690. It has strike-no strike, pull quarter repeat, calendar and alarm. In Amsterdam Joseph added a passing strike for the half hour.

Amsterdam, 28 July 1690

Dear Henry,

I am in immediate need of a striking bracket clock of the very highest quality, in the English style, of course. It should have pull quarter repeat and calendar work and if you are fortunate enough to find one that also incorporates an alarm I will consider myself lucky. I desire that it be finished there in London, for I am over my head with work. Needless to say I want my name engraved on the backplate (and on the dial if possible) with the words "Joseph Norris Amsterdam". The quality of the engraving should be in keeping with the quality of the clock so please see if Tom's engraver can do it. Please use your best judgment about the details and with the hope that you give me your full attention, I remain

Yr Obed't Servant

Joseph

Eager to please his younger friend (who was now age 40) the next morning Henry went over to The Dial and Three Crowns only to find nothing available at once.

"Joseph Knibb showed me a clock he is just finishing," said Tom. "It might meet the requirements. As to the engraving, of course I will have A.T. do it. I will put it at the front of his new work. Just send me the dial and backplate."

Henry walked back down Fleet Street, saw the clock, and made immediate arrangements for Joseph Knibb to have the engraving done by Tom and then packed and sent off to Amsterdam.

Paul Odendahl continues a curious mix of history and fancy in this story about 17th century clockmakers.

The author thinks it is time now to say that we are coming to the end of the Henry story.

We have followed Henry's life and adventures from 1651 to the present 1690 for 39 years. During that time he fought as a soldier with the old sergeant under Cromwell in Scotland, migrated back to England, met Major Buffington, and worked with the Tompions.

After completing his apprenticeship with Edward East he and Tom Tompion met Huygens in Paris, experienced the London fire of 1666 and were kicked out of London.

Now, in 1690, Henry cannot know it but he will die in 1695. We shall follow him until three years before that sad time when Henry is only a memory.

-Paul Odendahl

PINIONS OF REPORT *from page 3*

T*p*. (**D*p* = D** x **T*p*/T**. The outside diameter of the pinion blank or ***p*O.D.** is determined by the same relationshio as for the count wheel, but in reverse: (***p*O.D. = T*p* + 2/P*d***). This ***p*O.D.** calculated will normally represent the *nominal* outside diameter of the pinion of report. Since wheels cut during the seventeeth and eighteenth centuries do not always have a full depth of tooth below the pitch circle diameter, after the pinion teeth are cut it *may* be necessary to reduce the outside diameter of the pinion to avoid bottoming out on the count wheel. Others were cut extremely deep and a matching pinion with a larger than calculated outside diameter might work quite well. Making the blank about 3% to 5% larger than calculated would be a good rule of thumb. You can always reduce the diameter. The total depth of the pinion teeth can now be determined (**2.157/P*d*)** and the root circle diameter, the diameter at the base of the pinion teeth, is defined as (***p*O.D. - 4.314/P*d***).

Now an example, using one of my own 30 hour plate movements: It has a 78 tooth pin wheel with thirteen pins which means the pin wheel makes six revolutions in twelve hours. The count wheel has 54 teeth and the outside diameter measurements were 1.9733 in., 1.972 in. and 1.973 in. From above, the pinion of report has 9 teeth. (As a point of information, the diameter of the locking plate is 2.990 in.) Using the largest measurement the diametral pitch equals 54 + 2/1.973 or 28.3837. The pitch circle diameter equals 54/28.3837 or 1.9025 in. The pitch circle diameter of the pinion of report is then 1.9025 x 9/54 or 0.317 in. and the calculated outside diameter of the pinion is 9 + 2/28.3837 or 0.388 in. (The actual outside diameter of my brass pinion varies between 0.396 and 0.403 in. The hand shaped teeth have very different profiles.) The root circle diameter is 0.388 - 4.314/28.3837 or 0.2.36 in. and the tooth depth is 2.157/28.3837 or 0.076 in. (Since there are so many variations in how the square is shaped, its size, whether it is straight sided or tapered and what relationship exists between the corners and sides of the square and the pinion teeth, you will have to custom match the hole in your new pinion to the actual square on the arbor end. If requested, this could be the subject of another article. Normally, the locking plate was fastened to the count wheel AFTER the pinion and count wheel were matched.)

ADDENDUM

Even if you were unable to determine the exact relationship between the square hole in the pinion and the pinion teeth, there is a good chance that you can make the pinion work properly. After ensuring that the engagement between the pin wheel, the stop wheel or hoop wheel and the warning wheel is correct: There are usually marks on the wheel and pinion teeth to show the proper engagement between the pin wheel and the second arbor pinion (the second arbor has the stop or hoop wheel mounted on it), and frequently between the stop or hoop wheel and the third arbor pinion (the third arbor has the warning wheel mounted on it) — after checking the engagement between those three wheels (pin, stop or hoop, and warning wheels), engage the count wheel with the pinion of report and try the strike function. The detent should drop into the notch in the locking plate just as

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PINIONS OF REPORT *from page 7*

it clears the entry side of the notch.

One real key is whether the train will strike one and still be in position to strike two. If it does not function properly move the count wheel engagement with the pinion of report one tooth and try again. There is a high probability that before you get all the way around the count wheel, one tooth at a time, the strike will work properly. Don't quit until the train will strike one through twelve, without a miss or hang up. Assume that you have gone all the way around the count wheel and you do not get the strike working properly. If the pinion of report is mounted on a square extension of the pin wheel arbor and the number of teeth on the pinion is not divisible by four, just rotate the pinion relative to the square extension 90 degrees and try again. Before you have rotated the pinion relative to the square four times, the strike should be working properly. (If the extension is anything but a square and the number of teeth in the pinion is not divisible by the number of sides on the extension, the same procedure can be followed.) After you have found the proper relationship between the pinion and the square extension, use a triangular or knife file to file a notch across the center of the pinion face and the end of the square extension for future reference.

ROGER GENDRON is a retired company president and professional engineer and a former Air Force pilot. He has been a member of NAWCC for 30 years with a particular interest in 17th and 18th century British clocks.

NEXT MEETING

Ft. Mitchell, KY, Friday, April 16, 2004, at 2PM. Consult your program for location. Hope you will plan to attend.

RECOIL

DENNIS RADAGE from Vancouver, British Columbia writes concerning Doug Cowan's article *Is This Skeleton Clock American?* which appeared in BHT31 dated November 2003:

"I need to touch and feel any clock that I try to analyze or appraise (but) with the information and images provided I would have to suggest that this clock is predominantly an English clock.

"I have seen a number of references of clock parts being shipped to the USA from England and the clock being either assembled or finished in the USA. Of course this also applies to many "tallcase" clocks as well, even some apparently "made by" prominent US makers, naturally called American clocks.

"I guess that the subject that needs definition is "made by" or "made in". What constitutes "made in"? Is there or should there be a local minimum content of key strategic local components to call the finished product "American"?

"England had the same issue, although much more obvious, with parts and movements imported from Germany around 1900, and finished and cased with an English name on the dial - the dial, case and maybe a few additional components being made in the UK. Today we clearly call these German clocks. The same is true for France.

"From my experience and from what I read and see in your article I would strongly suggest that some key strategic components came from England. I would call it an English skeleton clock. More detailed research, or an acceptance of an appropriate definition of "made in" may eventually prove otherwise.

"At any rate the signatures on the clock do give it local significance, worthy of mention."

MISS MUFFET was a 16th century little girl whose real name was Patience, the daughter of Dr. Thomas Moufet, a famous British entomologist who wrote *The Theatre of Insects* and who died in 1604. He is said to have specialized in spiders. He probably had one or two lantern clocks (in those days known as "brass clocks") in his establishment.

Some think that in those days doctors in England used spiders as medicine and that Dr. Moufet, who was a medical doctor, believed that eating mashed spiders was a cure for the common cold. To treat a fever a doctor would roll a spider in bread crumbs and feed it to the patient.

Curds and whey, or junket, was a custard-like food made of sweetened milk. Curds and whey was also an old name for cottage cheese: curds lumpy and whey milky.

There is disagreement about what Little Miss Muffet sat on. A tuffet could have been either a low three-legged stool or a small mound of grass covered earth.

Believe this story if you like: When his little daughter, Patience, got sick, Dr. Moufet emptied a sackful of spiders on her head and body, thinking they would make her well. They didn't.

-The Editor

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