

OCTOBER 1993

THE HOROLOGICAL TIMES

American Watchmakers-Clockmakers Institute



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HOROLOGICAL TIMESTM

Official Publication of the American Watchmakers-Clockmakers Institute

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HOROLOGICAL TIMES (ISSN0145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 3700 Harrison Avenue, Cincinnati, Ohio 45211, for \$45.00 per year (\$4.50 per copy in the United States and \$50.00 per year, \$5.50 per copy outside the U.S.) Second class postage paid at Cincinnati, Ohio. POSTMASTER: Send address changes to *HOROLOGICAL TIMES*, P.O. Box 11011, Cincinnati, Ohio 45211.

OFFICE HOURS: Monday through Friday 8:00 AM to 4:00 PM (Eastern Standard Time). Closed on all national holidays. PHONE (513) 661-3838, AWI HOTLINE: (513) 661-4636 (24-hour recording), FAX (513) 661-3131.



HOROLOGICAL TIMESTM

EXECUTIVE AND EDITORIAL OFFICES

AWI Central
P.O. Box 11011
3700 Harrison Avenue
Cincinnati, OH 45211
Telephone: (513) 661-3838
Fax: (513) 661-3131
AWI Technical Hotline: (513) 661-4636

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Regina Stenger: *Associate Editor*
Donna Baas: *Production Director*

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President's Message



"I came here today to talk about an endangered species." This was my topic sentence at a jewelers trade show held recently in Portland, Oregon. This was a two-day show open to the retail jewelers so they could see all of the new merchandise available for the fall season. The show hours were from 10 am to 5 pm, preceded by a continental breakfast and a speakers program. This is where I came in; I was the first of two speakers on the second day.

My subject was "AWI", which is naturally one of my favorite ones. The room next to us was holding a mortuary convention. I was nice and didn't make any reference to it by saying "many think we have a dying art". I let the next speaker have this privilege. I came close enough when I started by saying "we are an endangered species". Before they thought my subject was about the spotted owl; I explained our real endangered species is the watchmaker and clockmaker.

I believe we are endangered (not dead or dying) and we all need to work to keep us well and alive. For this reason I was glad to be on the speakers program at that trade show. Even though it was Sunday, I tried not to preach but rather just explain some of the things AWI has to offer. As members, we all know that we have much to offer to not only our members, but potential new members. With this in mind, I tried to present our case to an audience made up of mostly non-members. They were nice to me and did not throw tomatoes. Who knows, maybe I did some good. I feel this speech value was not like running a promotional ad (which must get immediate results), but more like an institutional ad (results may materialize down the road). Therefore, if a lot of these jewelers join five years from now, I will be happy to take the credit.

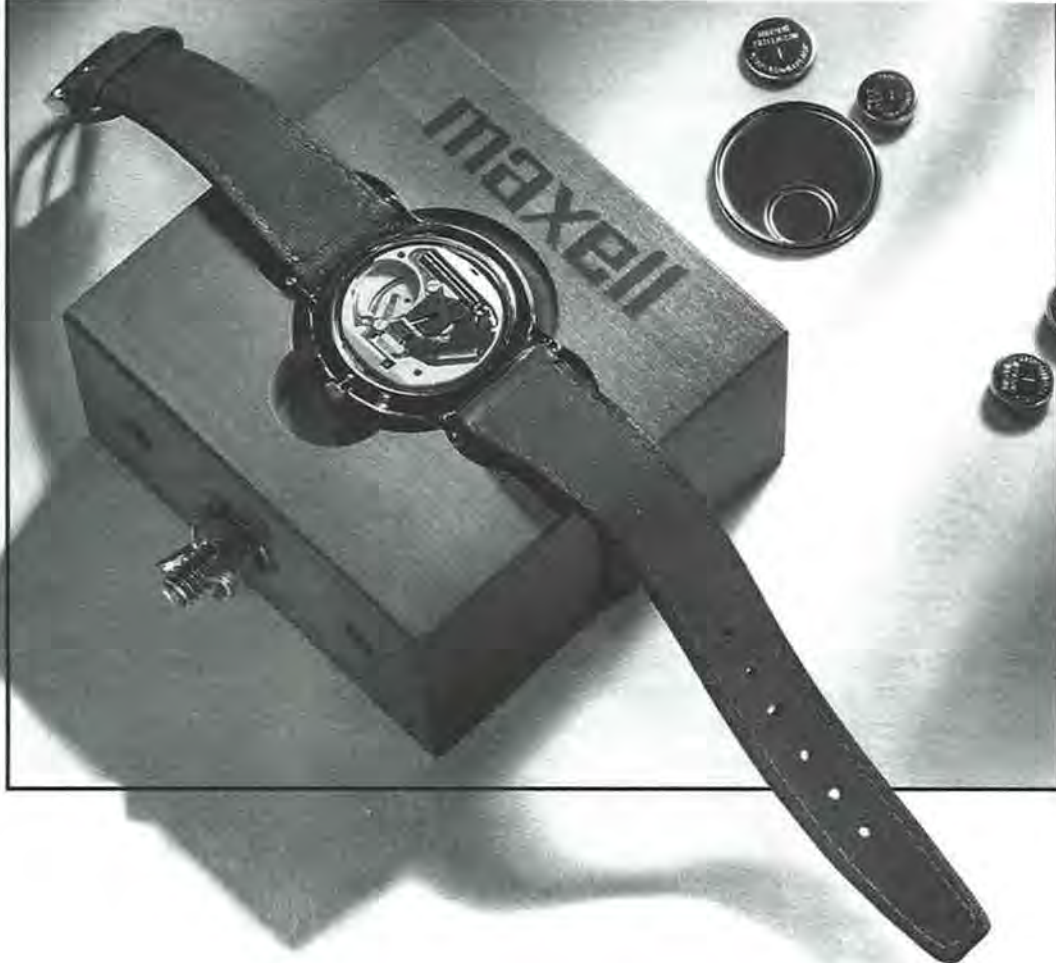
All joking aside, we all need to make any contacts we can. Like any good sale, it starts with people talking. And we need a lot more of AWI talking going around.

I did attend this trade show on my own (no expense to AWI) because I wanted to be there also as a jeweler and make some necessary purchases for my business. I was glad to see several of the other watchmaker-jewelers were already AWI members and they seemed to like some of the update information that my speech gave them. At least they said they did.

Yes, we need to work together with all facets of our industry. Someday again we may not be considered an endangered species.

Wes Door

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Questions & Answers



HENRY B. FRIED

CMW, CMC, FAWI, FBHI, ★FNAWCC

Properties of Brass

Q I have always been confused about the properties and composition of brass used in our trade. What can you tell me about it?

B. McAninch
San Antonio, TX

I have asked J.M. Huckabee from your own state of Texas to respond to your question. An engineer, clockmaker, and HT technical writer, Mr. Huckabee is well qualified to answer your question.

--HBF

A Brass is an alloy of copper and zinc. Red brass is about 85% copper; yellow brass about 70-75% copper; and white brass about 50-55% copper.

Free machining brass has about 1/2 to 1% lead added to improve cutting. Free machining yellow brass would be an alloy of about 1/2% lead, 75% copper, and the remainder zinc.

Cast brass (any type) is soft. As it is rolled to a thin form, it is usually done in 8 steps. It becomes thinner, harder, and more brittle as it is reduced in thickness. Number 8 (which is 1/8th of original thickness) is the point that it begins to crumble into pieces. That has little or no use.

Number 6 brass is often called "spring brass" and is used for springs. Half-hard brass is rolled to 1/2 of its original thickness and would be called #4. Common names are "quarter hard," "half-hard," and "three-quarter-hard."

For most uses, brass is sold as "half-hard." That is what we

should use for wheels. If it is "lead half-hard" it works easily. Probably you will not be able to find it in small quantities, being usually rolled to order.

I make wheels from pieces like the one I'm sending you: it is 0.016" thick and 4x12" for about a dollar (including tax). It is half-hard yellow. If you buy for small wheels, get 2x12" by 15-25/1000" (0.015 - 0.025"). Thicker sections are too heavy cutting for the watchmaker's lathe as a wheel cutter.

J.M. Huckabee

Send your questions to:
"Questions & Answers"
c/o AWI
P.O. Box 11011
Cincinnati, OH 45211
Please enclose an SASE

Q My customer would like to know the age of the watch shown here. The case is sterling silver, the name on the ribbon inside the back of the case is "Lady Racine," no name is on the movement or dial. The movement is a cylinder escapement. Any help you can give me is greatly appreciated!

George Jones
State College, PA

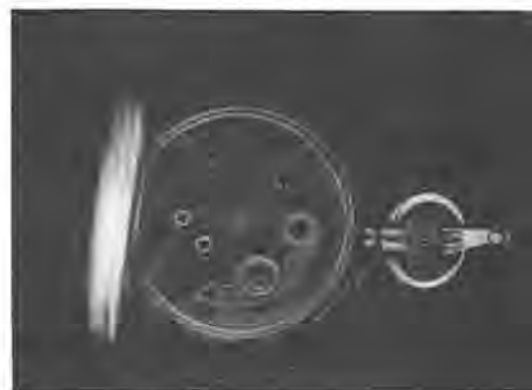
A The photos of your watch reveal a Swiss-made watch of the 1880 period. This was the era when the hands were set by the pin-setting system, emerging from the case at the XI position. This system soon afterwards evolved into one not requiring two hands to alter the po-

sition of the hands.

The cylinder escapement and system of bridges were also popular on more reasonably priced timepieces. The silver cases were well made of good grade silver, the cases sometimes adorned with the cloisonné enamel decoration.

When names do not appear on a dial or movement, more than likely it was due to the jobber not knowing beforehand who his retail or importer-exporter would be.

Henry B. Fried



Borel

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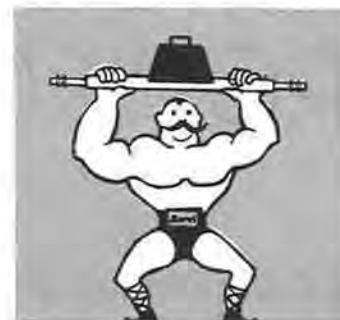
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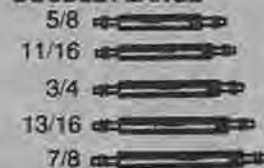
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STAINLESS
STEEL**



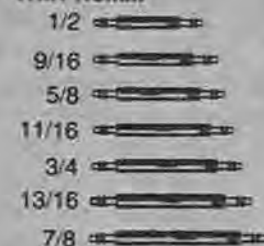
DOUBLE SHOULDER



DOUBLE FLANGE



THIN 1.5mm



SPECIAL BUCKLE No. 20

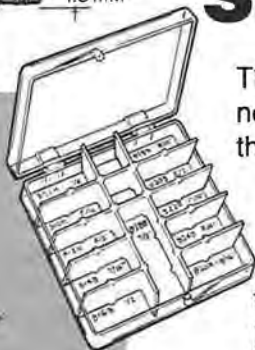
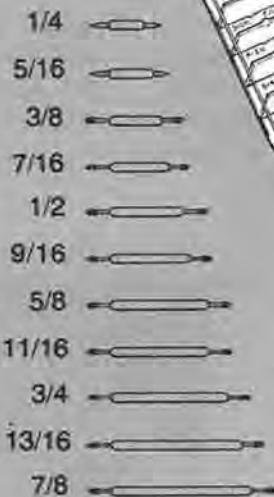


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ROCK QUARRY et tu

Thoughts on Space and the Whole Darned Thing

FRED S. BURCKHARDT



Well, they did it again. A billion dollars spent on the Mars spacecraft, and it didn't work. So who do they blame? Just because the clock supposedly didn't work, the poor old watchmaker or clockmaker who worked on that sucker better watch out. Talk about comebacks!

How come a customer with a \$25 watch complains if it doesn't keep time within three seconds a month, yet a billion dollar blooper can be dismissed with, "Well, these things happen"?!

Let's face it. A billion here and a billion there sure does add up. I have to work almost a whole year to make that much money. Surely they could give me one-tenth of that so I could retire. For that kind of money, I would be *more* than happy to take the blame for the thing not working right.

I guess I never really understood this space stuff. Who really cares what's on the moon or Mars or Jupiter? I figure there's a lot of places right here in the good old USA that I'd rather visit.

Now don't get me wrong; I'm all for progress. But a billion just to see what some place looks like? That would almost buy three or four airplane tickets to the East or West coasts! Don't you think that would be better than travelling millions of miles to get somewhere and find they may not even have a Motel 6? From the pictures I've seen of these Mars people, I'm not too sure if I want to fraternize with any of them. Besides, how do we know if they even use watches or clocks? See what I mean? You could travel all that way and take a chance on not even finding a job!

Can you imagine going all that way and then finding there are no parking spaces? It could be just like Manhattan. (Whenever I think of Manhattan, it amuses me to picture those jokers who thought they were getting the best of the Indians when they bought the place for 24 bucks. All the time the Indians were laughing at them because they didn't know that in the Indian language, *Manhattan* means "no parking".) What if you were about to land, and you saw a huge sign that read: "SURGEON GENERAL'S WARNING! IF YOU LAND HERE, YOU'LL GET CANCER!" ... So you turn around and come back. All that time wasted for nothing.

Now don't get me wrong; I think there are some good things to say about space. Maybe someday they'll discover a place we could send all the murderers, rapists, child abusers, and the watch manufacturers who won't sell parts to watchmakers.

Most people don't mind paying taxes. They just get upset about how their tax money is spent. I remember several years ago I took a survey of several thousand watchmakers and clockmakers, asking them if they were against paying taxes. The majority said they weren't sure, as they were never able to make enough money to have to pay taxes.

I say let's all write to our Congressmen and Congresswomen, telling them to quit squandering our tax money! Instead, use it wisely: Like sending the person who designed the Mars spacecraft clock back to school. Or for research on the gestation period of a species of lizard in Uruguay.

□

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J.M. HUCKABEE'S "Random Clock Talks"

The series of 37 "Random Clock Talks" videotapes listed below are available for loan to AWI members from the AWI Audio Visual Library. The tapes vary in viewing time from 1.25 to 2.00 hours and are available in the VHS format. A service charge of \$5.00 each is to accompany requests to borrow a tape; only one tape is loaned at a time. The service charge covers AWI's production and shipping costs. Tapes should be returned to AWI within 7 days after receipt, insured for \$30.00. Please order tape by number along with your name, address, and \$5.00 service charge. Send to: **AWI Audio Visual Library, 3700 Harrison Ave., Cincinnati, OH 45211.**

TAPE 1: Approximately 2 hours

SUBJECT MATTER: A brief view and discussion of a variety of clocks and tools used in the Huckabee shop.

TAPE 2: Approximately 2 hours

SUBJECT MATTER: Demonstration and discussion on using various tools and lathes to make and fit a clock bushing.

TAPE 3: Approximately 2 hours

SUBJECT MATTER: Discussion and demonstration on lathe operation using the Boley watchmakers lathe and the C&E Marshall watchmakers lathe.

TAPE 4: Approximately 1.50 hours

SUBJECT MATTER: An analysis and work with the Urgos 21/42 8-day trapezoid time only clock.

TAPE 5: Approximately 2 hours

SUBJECT MATTER: A demonstration and discussion about drilling the arbor using Huck's "turning in a box" method and making a pivot.

TAPE 6: Approximately 1.75 hours

SUBJECT MATTER: A demonstration of wheel cutting using clear plastic and a Mosley watchmakers lathe. Huckabee cuts four gears such as those required in the AWI certification examination.

TAPE 7: Approximately 1.75 hours

SUBJECT MATTER: The Birge & Mallory Striker Clock—a complete study and analysis of the Birge & Mallory Striker and the clock with its strap plates and roller pinions, circa 1841.

TAPE 8: Approximately 2 hours

SUBJECT MATTER: Making a great wheel and mounting the great wheel on its arbor.

TAPE 9: Approximately 1.75 hours

SUBJECT MATTER: Making and fitting a replacement pinion for a clock wheel.

TAPE 10: Approximately 1.50 hours

SUBJECT MATTER: Correcting problems caused by an elongated pivot hole by bushing with a solid bushing and the use of a "preacher" to relocate center distance.

TAPE 11: Approximately 2 hours

SUBJECT MATTER: Huckabee discusses the IBM #37 Master Clock Movement and IBM 90 Series Clock Movement.

TAPE 12: Approximately 2 hours

SUBJECT MATTER: Using a custom-made attachment to make wheels and index plates on the Unimat lathe. The custom-made attachments can be made from drawing available from AWI upon request (cost to cover printing and postage is \$2.00).

TAPE 13: Approximately 2 hours

SUBJECT MATTER: Cutting clock wheels—a demonstration of cutting the wheels used in the AWI CMC examination.

TAPE 14: Approximately 2 hours

SUBJECT MATTER: Using an inexpensive quartz analog clock movement, Huckabee disassembles the movement and provides an in-depth explanation of each component and their function in the operation of the timepiece.

TAPE 15: Approximately 2 hours

SUBJECT MATTER: Huckabee presents an in-depth discussion on the design of cutting tool bits, both hand-held and those held in the tool post rest. Also a discussion of steel—its composition and characteristics.

TAPE 16: Approximately 1.50 hours

SUBJECT MATTER: Huckabee presents an in-depth discussion about hairsprings. He also demonstrates how to vibrate a clock hairspring.

TAPE 17: Approximately 1.75 hours

SUBJECT MATTER: Huckabee goes through the process of making a knurled nut, one like those used as hand nuts in Early American kitchen clocks. He demonstrates a simple way to knurl the nut.

TAPE 18: Approximately 1.75 hours

SUBJECT MATTER: Huckabee demonstrates the process of inserting a tooth into a clock wheel to replace a broken or damaged tooth.

TAPE 19: Approximately 2 hours

SUBJECT MATTER: Pivot work in the American antique Sessions, count wheel, and clock movement.

TAPE 20: Approximately 2 hours

SUBJECT MATTER: Continuation of work with the Sessions clock used in Tape 19. Complete restoration work on the movement and treating a worn great wheel.

TAPE 21: Approximately 2 hours

SUBJECT MATTER: Making an American clock verge. Huckabee demonstrates how to select and work raw materials into a verge for an Ingraham miniature kitchen clock—time only.

TAPE 22: Approximately 2 hours

SUBJECT MATTER: Completion of making a verge for an Ingraham kitchen clock from Tape 21. Also random tips and cutting a 32-tooth recoil escape wheel for an Ansonia kitchen clock.

TAPE 23: Approximately 2 hours

SUBJECT MATTER: Pivot and bushing problems and their repair.

TAPE 24: Approximately 2 hours

Not available at this time.

TAPE 25: Approximately 2 hours

SUBJECT MATTER: Clock mainspring and barrel work.

TAPE 26: Approximately 2 hours

SUBJECT MATTER: Clock mainspring ends and barrel teeth. Huckabee demonstrates how to replace teeth in the barrel of an Urgos 8-day modern clock. Huckabee also fashions a new hole end for the mainspring.

TAPE 27: Approximately 2 hours

SUBJECT MATTER: Understanding the antique American clock time train and repairs to it and using the Unimat lathe to polish pivots.

TAPES 28 & 29

Not available at this time.

TAPES 30-34: Approximately 2 hours each

SUBJECT MATTER: A series of five tapes designed as a teaching exercise which encompasses every facet of lathe work encountered in the clock shop. Produced in conjunction with a series of drawings which are provided by AWI when you borrow the first tape in the series. Upon completion of the work you have a set of excellent useable lathe accessories for use in your shop.

TAPES 35 & 36: Approximately 2 hours each

SUBJECT MATTER: Two tapes which demonstrate the use of the lathe accessories produced in the Series 30-34. This encompasses all facets of pivot work encountered in the clock shop.

TAPE 37: Approximately 2 hours

SUBJECT MATTER: A companion tape to the Huckabee book "How to Build a Regulator Clock." All components and details for their construction are discussed in detail. It is recommended that the viewer have the book at hand when viewing this tape.

As a Clockmaker Turns

Clockmaking with Another Small Lathe



J.M. Huckabee, CMC, FBHI

There are many small lathes of less renown than the American watchmakers lathe that can be used by the clockmaker. And like the watch lathe, these have a long list of advantages, disadvantages, and user preferences. Overall, most any small lathe can give a good report when given a skilled operator. Let's discuss an example and see how it operates.

A lathe that does not have a collet-holding feature will need a good 3-jaw chuck. Now what is a good chuck? One that is within the size range of our work; and one that will hold the work so as to run reasonably true. So let's look into the chuck situation. Our chuck discussion will be equally true in principal, regardless of size, make, or origin.

Turn your attention to Figure 1. The left piece is a 3-jaw chuck, rear view. This chuck is suitable for any small lathe and may be found on watchmakers lathes. The chuck does not know a lathe brand or size, it's a chuck. The surface and pocket indicated is the last machine operation in building the chuck. The chuck was locked onto a perfectly true spindle, its own jaws holding it onto that spindle. Then the pocket was bored and the flat surface faced. This means the area shown is dead-true to a representative diameter that the jaws were holding. Now that is a true chuck.

Look at the right piece indicated in Figure 1. This is the "chuck back", or piece that will adapt the chuck to the companion lathe headstock. This piece arrives in "blank form". If this chuck is to be used with a watchmakers lathe, the "chuck back" would be in the form of a collet stub that fits your lathe spindle. Now clean and adjust your spindle bearings, clean your headstock bore, and set up your collet stub with extra care and very tight. Machine the collet stub with a tang and face that looks like the rightmost piece in Figure 1. Be sure the tang-fit into the chuck bore is snug-tight. Clean the pieces well and fit the screws tight; your chuck will run true!

The pieces in Figure 1 are for an older Unimat lathe. I machined this piece about 12 years ago; the

chuck yet runs perfectly true. However, if I want this to run true on another Unimat lathe, it will need a new back. Same is true with the watch lathe. Don't expect these chucks to be any better than "almost true" when tested from lathe to lathe. We will use the



Figure 1. Run-out of a 3-jaw chuck is largely dependent on how the chuck back (L) fits onto the lathe spindle-hub (R).



Figure 2. This small clock wheel hub is turned with very high precision in an older Unimat lathe with the aid of these simple fixtures.

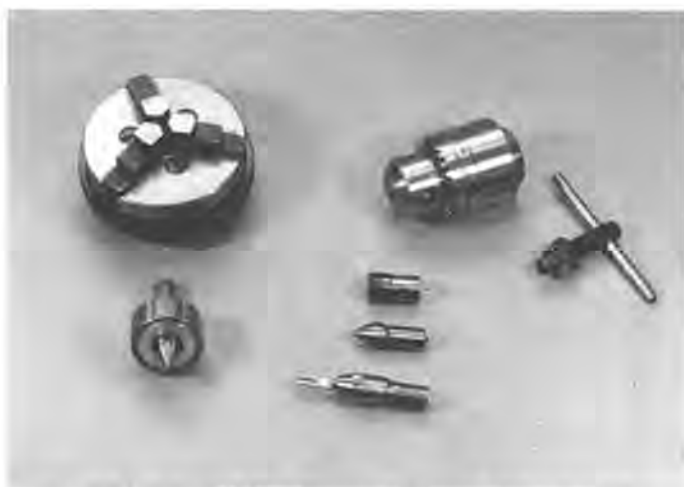


Figure 3. Unimat lathe accessory group; the piece in lower center is a hand-made tailstock fixture.



Figure 4. These pieces will turn most small lathes into highly precision machines, by the art of mandrel turning.

3-jaw chuck and a drill chuck for most of our work on the Unimat.

Look over the second illustration. We have the same chuck along with some pieces used with a hand-held graver for making a wheel hub, pivot bushing, or some other small cylindrical-shaped piece with a through hole. Leftmost is a small wood spool with a brass rod tightly fitted. Place the chuck on the lathe spindle, insert the brass rod full depth, and turn a female center in the brass. Now slip a small pin snug into a hole in the spool. You will have a splendid device called a "carrier" in some of the older literature. It is perfect because the center was cut that way! No commercial device can exceed its accuracy in the same lathe. The piece in upper center of this illustration is a tool rest, a 1/2 inch diameter by 2 inches long cold, rolled-steel rod. It's just right for our need. Further to the right is a tailstock adapter to accept the adjacent insertable brass center, 1/8 x 7/8 inch brass rod with a male and female center. At lower center is the wheel hub on a mandrel.

Turn to Figure 3. With exception to the tail-

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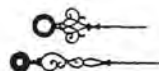
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Figure 5. Rear view of the Unimat lathe tailstock. This modification permits use of small insertable tailstock fixtures.

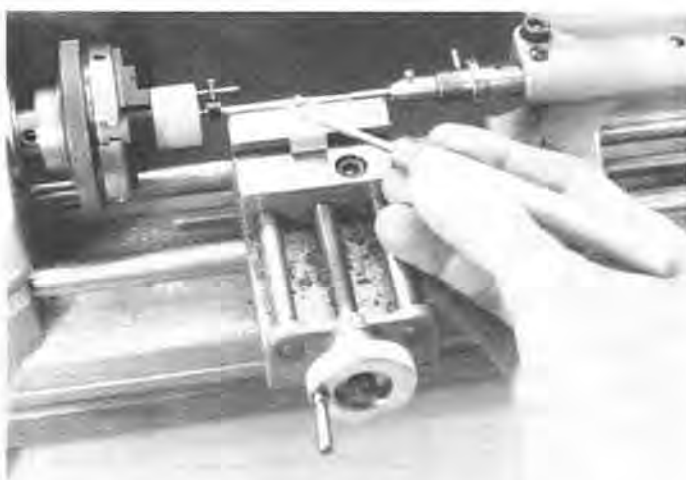


Figure 6. Mandrel turning in the older Unimat lathe using a hand-held graver--a very precise method of turning.

stock adapter (lower center) all of these pieces are of Unimat origin. We will use the chucks, but the other Unimat pieces are a bit large for our immediate need.

Look over Figure 4. This is a group of pieces used in a watch lathe for a similar demonstration. Most of these will fit directly into the Unimat.

A top rear view of our tailstock runner (Figure 5) shows a lever-screw that was added to the runner. This screw locks the adapter in place, which is not holding a pivot polishing bed. The screw thread is #5-40.

Figure 6 shows mandrel turning in progress. From left to right we have: carrier with wood spool and drive pin; driver, sometimes called a lathe dog; mandrel with hub in central region; tool rest (short, a long rest is shown in Figure 2); female center in adapter; and a hand-held turning graver. Don't worry about the Unimat bearings, they are preloaded balls and will put the bearings of many watch lathes to shame! We here have all the facilities for turning between centers with the acme of excellence.

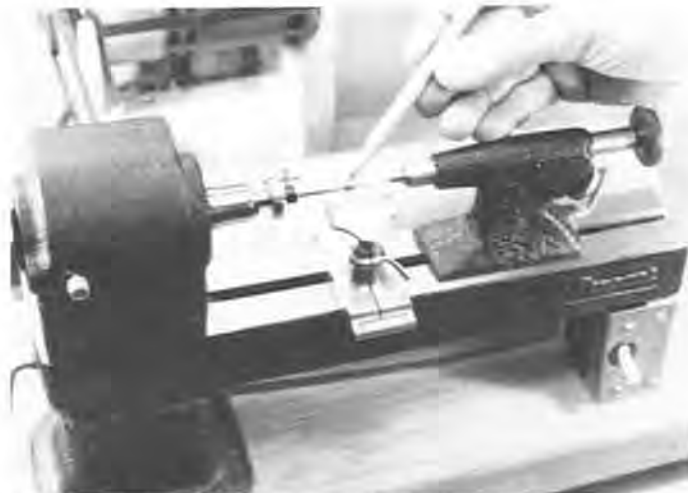


Figure 7. Mandrel turning with a Pennant watchmakers lathe. The fixtures and methods are the same as with the Unimat lathe.



Figure 8. These gear cutters need a good strong arbor to be driven in a small lathe. The arbor shown is for the older Unimat machine.

Let me make a disclaimer on the work in Figure 6. The hub is in the central area of the mandrel to facilitate visibility of the respective pieces. In fact, it should be located very near the headstock or tailstock to improve rigidity of the setup.

The proper sequence of hub making is to drill and ream a small billet of brass that will press-fit onto its arbor. Then press our billet onto the tapered mandrel for the initial rough-out cuts. Then press the rough hub onto its final arbor, place the arbor between centers, and make final cuts with a very sharp graver. This yields a perfectly true hub.

How would this job be worked in a watch lathe? Figure 7 shows a less familiar watch lathe bearing the name Pennant--same idea, type of tools, same perfectly true hub, and same disclaimer.

Can the Unimat lathe do other forms of clock-making? Indeed it can; and you can bet your Texas boots on that! However, when it's new, just out of its box, it won't do much. It's just like the watch lathe, many tools and fixtures must be constructed before



Figure 9. Index fixture, edge notched plates, cutter arbor, and other accessories for wheel making. These pieces were built for the older Unimat lathe, and adaptable to other small lathes.

it really begins to "walk and talk". Let's look over some tools built for use with this little lathe.

Figure 8 shows an arbor and drawbar made for my Unimat. When this spindle was finished to semi-final form, it was placed in the lathe, then its right end was cut for a snug-fit to the bore of the gear cutters shown. The tip was threaded for a locknut. It runs perfectly true. To cut gears for clocks we need an indexing fixture. The Unimat fixture for this lathe

could not accommodate the high tooth count needed in clockwork.

Look over the tools in Figure 9. These were designed for the older Unimat to make clock wheels: about 65-70 edge-notched index plates, the index fixture, back-up plates and spacers for various wheel sizes, and cutter arbor. These same tools (cutter arbor excepted) are used with my Derbyshire micromill and may be adapted to other small lathes or milling machines. The index plates cover all important wheel tooth counts from 3 through 96. One of the Random Clock Talk Tapes shows these tools in operation. □



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Making a Minute Snail and Quarter Snail Assembly for a Minute Repeater

Part 3



Ron DeCorte, CMW

In Parts 1 and 2 of this article I have discussed the drawing, special cutters, and the fabrication process for the parts of the minute and quarter snail assembly. In this final part, I will discuss the assembling and installation of these parts, the machine tools used in the fabrication process, and introduce an alternate method of fabrication.

--Ron DeCorte

ASSEMBLY & INSTALLATION

Photo 10 shows (left to right) the minute snail, minute surprise piece, and the quarter snail. Photo 11 shows the same parts arranged on the face of a penny. These parts have been finished and are ready for assembly and then installation into the watch.

It is very important that before the parts are assembled onto the cannon pinion, the cannon pinion be checked for proper fit on the center wheel pivot.

The minute snail is either screwed or riveted to the cannon

pinion. The surprise piece and the quarter snail are secured together and fit onto the lower part of the cannon pinion under the minute snail. Be sure that the banking spring is acting against the banking pin properly and that the surprise piece/quarter snail assembly is free to rotate on the cannon pinion. Also make sure that this lower assembly has the proper amount of rotation when acted upon.

Photos 12 and 13 show the

Photo 10



Photo 11



Photo 12



Photo 13





Photo 14

parts at two different stages of assembly. You may note in Photo 12 that the quarter snail is lacking the trip pin that interacts with the hour snail star wheel. If you look closely you will see that the friction nut that holds the surprise piece/quarter snail assembly onto the cannon pinion has been drilled and fit with a brass pin. This was done so that the nut could be rotated until the temporary trip pin changed the hour approximately 1-2 minutes after the surprise flirt acted upon the surprise piece. Through this process I was able to establish the proper location for the trip pin that would be fit into the quarter snail. The quarter snail was marked and then drilled and fit with a permanent trip pin. The hole for this pin was made slightly larger than the pin needed to be so that there was material to be filed away for final adjustment. If you look closely at Photo 13 you will see the trip pin located near the intersection of the first and fourth segments of the quarter snail.

The moment of truth has finally arrived. The complete and finished assembly is now ready to be installed into the watch. If all has been done correctly, and with a little luck, the parts will function properly. In case there are difficulties, common sense and a lot of knowledge about how the parts interact should be all that is needed to correct the problems encountered. Photo 14 shows the finished



Photo 15

assembly installed into the watch and operational.

MACHINE TOOLS

It would be difficult to attack a job of this type if you were not equipped with the proper tools and equipment. I would therefore like to mention some of the machinery that was used during this project.

All of the machining work was accomplished on Habegger 102mm lathes. One of these lathes is pictured in Photos 15 and 16. In both photos it is fit with a milling attachment and each photo shows a different job being performed. In



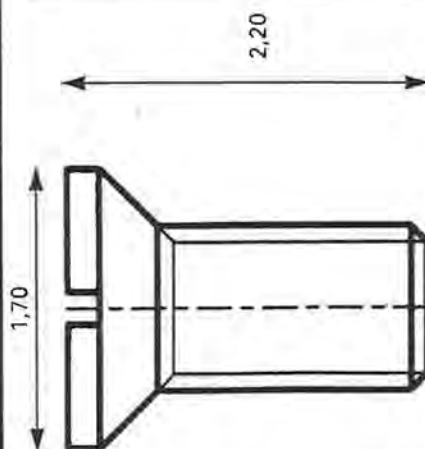
Photo 16

Photo 15 I was cutting the teeth on one of the special cutters used to make the minute snail, and in Photo 16 I was cutting the steps on a minute snail. You may note in the latter photo that a spotting scope was employed in order to observe the work in progress. Also noteworthy in these two photos is the dividing attachment located at the rear of the headstock.

You may be wondering why lathes of this size are used to make such small parts. It is my opinion (as well as others) that the rigidity of such machines adds up to greater accuracy in the final product.

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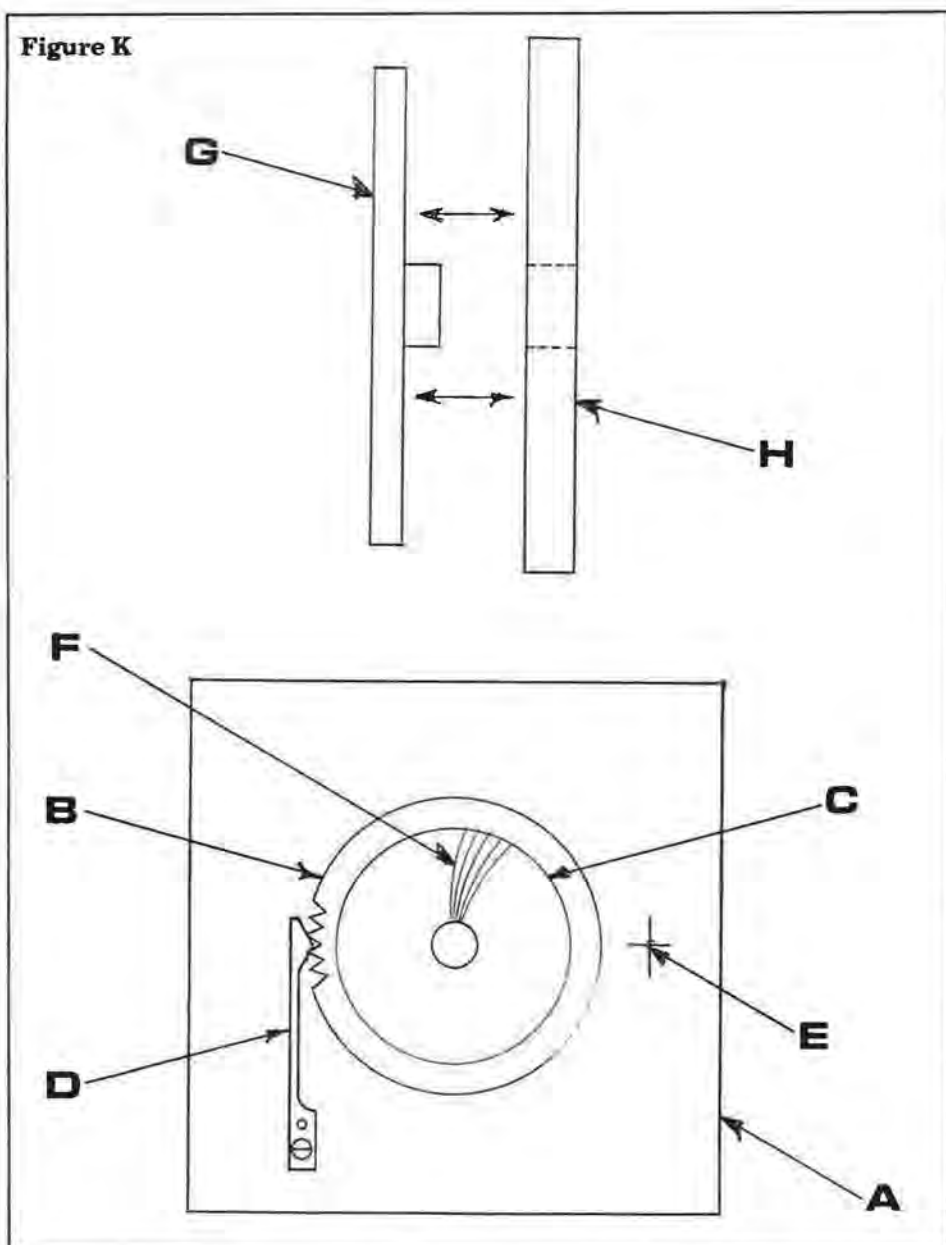
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Figure K



Another tool used during this project was my Hauser optical comparator. This tool allowed direct comparison of scaled drawings to the actual parts as they were being fabricated. This particular machine also let me take measurements directly from the watch with great accuracy.

ALTERNATE METHOD

I would like to share with you an alternate method of making the minute snail. This information was given to me by one of Switzerland's great watchmakers, Mr. Philippe DuFour. The following description was translated to me verbally by Mr. DuFour from French text.

Prepare a disc of the appro-

prate size for the minute snail. A fixture for laying out the minute rack arcs is made next. Mount a 60-tooth wheel (gear) on a plate so that it is secured but can be rotated. Through the center of the wheel an axle is mounted so that the snail blank can be secured in such a way that the wheel and blank can rotate together. A jumper is now fixed to the plate so that it controls the rotation of the 60-tooth wheel (and blank) one tooth at a time. At a distance from the center of the wheel equal to the distance from the center of the watch to the pivot point of the minute rack, a point is made in the plate to accommodate the point of a compass. As you will note, the size of the 60-tooth wheel

must not be too large in diameter as to allow the compass point to engage this point in the plate. The snail blank is mounted together with the 60-tooth wheel on the plate and a compass is prepared with a radius equal to that of the center of the watch to the minute rack pivot point. The compass is used to scribe an arc on the blank. The work is rotated to the next position (one tooth space of the wheel or 6 degrees) and another arc is scribed. This process is repeated until 60 arcs have been scribed on the blank. The blank is now removed and heated until it turns dark blue. Lay the side of the blank that has the arcs scribed on it on an abrasive surface and remove the blue color from the flat surface. This will leave the scribed arcs as blue lines on a silver surface.

Prepare 14 steel discs, each one corresponding to the depth of the 14 steps of the minute snail. These discs should have a small diameter on one face that is equal to the size of the hole in the middle of the snail blank. This will allow them to be fit together with the snail blank in a concentric manner. Harden all 14 discs but do NOT temper them. These discs will be used as filing guides for the 14 concentric diameters of the minute snail. Mate the discs with the blank, one at a time, and hold in the vise or tongs. Carefully file the diameters (steps) of the snail to the scribed arcs, starting with the largest and working down in size.

Figure K is a sketch of what I think the above-mentioned fixture and filing discs should look like. In Figure K, detail A is the fixture plate; detail B is the 60-tooth wheel (only 4 teeth shown); detail C is the snail blank; detail D is the jumper; detail E is the point for locating the compass; and detail F shows some of the scribed arcs. Above the fixture in Figure K, detail G shows one of the filing discs and detail H shows the snail blank and how they would fit together.

I would like to thank Mr. Philippe DuFour for his inspiration and knowledge.



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Part LXXXIV

Making a Cylinder Escape Wheel



ARCHIE B. PERKINS
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The cylinder escape wheel is one of the most difficult, if not the most difficult, escape wheels to make. This is due to its design and the fact that it is made of steel. The design is complicated and the wheel is very fragile in its completed form.

The need to make a cylinder escape wheel is not as great as the need to make some other escape wheels because many sizes of cylinder escape wheels are still available from material dealers. The need to know how to make a cylinder escape wheel is important for the following reasons. One needs to be able to make the wheel that cannot be obtained, and if one can make the escape wheel, he would certainly be better prepared to deal with the cylinder escapement as a whole. Also, one's lathe skills are likely to be improved through these types of operations.

Figure 1 shows the most important specifications of a cylinder escape wheel. Most cylinder escape wheels have 15 teeth which makes the pitch equal to 24°.

$$\frac{360^\circ}{15 \text{ teeth}} = 24^\circ$$

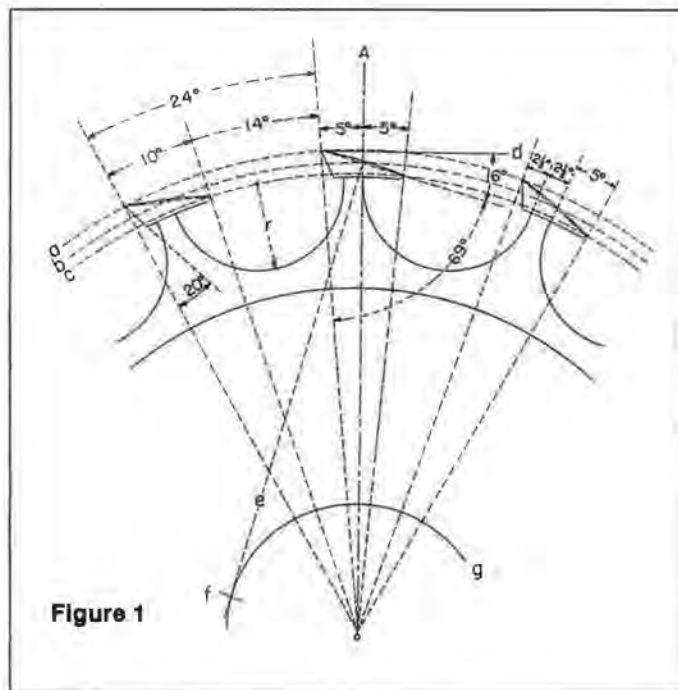


Figure 1

The width of a wheel tooth takes up 10° of the pitch which leaves 14° for space between the teeth in which the cylinder staff operates.

The angle on the impulse faces of the teeth is 16° from a line running from the heel of the tooth to where the radial line going through the tip of the tooth crosses the outside diameter circle (see line "d", Figure 1). Note: The angle on the impulse face of the teeth increases as the watch is made smaller. The angle of 16° is for clocks and large watches. Medium size watches can have an 18° angle and small watches can have as much as a 22° angle. With a 16° angle, this leaves 69° from the angle on the impulse face to the radial line running to the heel of the tooth.

The outside circle of the escape wheel is shown at "a", circle "b" goes through the center of the incline plane, and circle "c" goes through the locking points of the teeth.

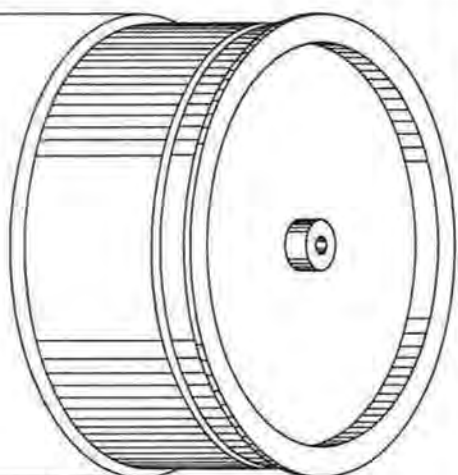
The heels of the teeth are undercut at a 20° angle. The impulse faces are slightly curved. The radius of the curve is equal to the distance from the center of 0 of the wheel and the arc "c" of the wheel. This distance is transferred to line "e" which is perpendicular to the incline plane of the tooth running from the center of the plane. Point "f" is the center for drawing the impulse face curve. Arc "g" is drawn for the purpose of plotting the radius points for the curved faces of the other teeth.

The width of the arms of the teeth is 2-1/2°. The edges of the arms are 2-1/2° from the heels of the teeth. The different parts of the drawing will be referred to during the making of the escape wheel.

MAKING THE ESCAPE WHEEL BLANK

Figure 2 shows the escape wheel blank being made on the end of a rod. The rod should be free-machining, high carbon, water-hardening steel such as the watch factories use. The blank can also be made from flat stock of suitable quality. One should first test the material before attempting to make a wheel blank out of it. One should saw more than half way through a piece of material and then break off the piece and inspect the grain where it was broken. The grain should have a fine, smooth, dark-grey appearance (almost black). There should not be any coarse or sparkling grains in the broken surface. The grain should be uniform.

Figure 2



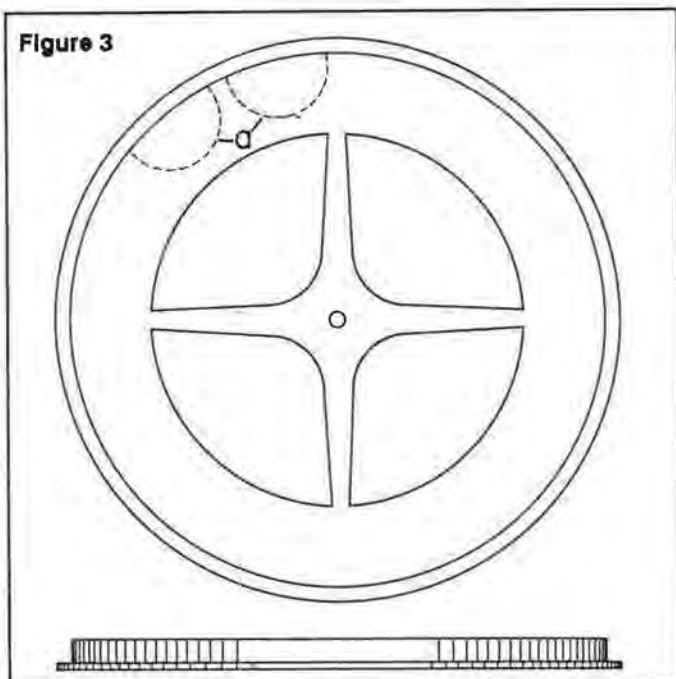
The material should come fully annealed so it will machine more freely.

The material is first faced flat and then bored out to the proper inside diameter and proper depth leaving a hub at the center of the blank (see Figure 2). Then a center is spotted and the center hole is drilled. Next, the diameter of the material is turned down leaving a lip at the corner on which the teeth will be formed. The diameters of the lip and body should be left slightly oversized at this time. These will be turned down after the blank has been removed from the material.

To remove the blank wheel, one can first use a cut-off tool to cut a groove as deeply as the tool will allow and finish removing the blank with a jeweler's saw as the lathe is turning slowly. Note: Always protect the lathe bed when sawing on the lathe.

After the blank has been removed from the material, it is chucked true by the lip of the blank while the bottom of the blank is faced flat and smooth. The bottom of the blank is left slightly too thick at this time to be stoned

Figure 3



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373	\$0.538	\$0.511	CR2325		\$0.860
377	\$0.400	\$0.380			
379	\$0.463	\$0.439			

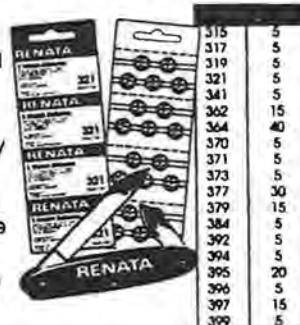
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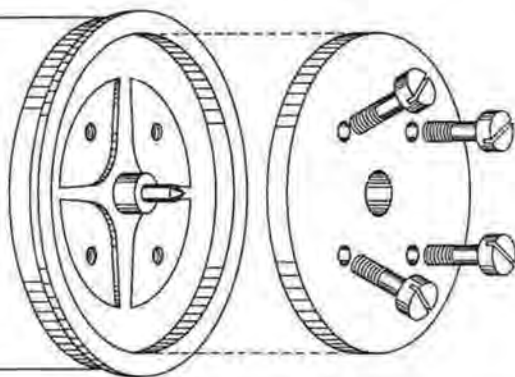


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Figure 4



to the proper thickness after the spokes have been made in the blank. Note: The bottom of the blank needs to be strong enough to allow the spokes to be made without the blank becoming distorted. The opening for the spokes should be as large as possible, allowing for the "U" spaces to be cut without making the inner rim of the wheel too narrow and weak. See View "a", Figure 3.

After the spokes have been made in the wheel blank, one would start doing the operations needed to complete the escape wheel. A method of holding the blank is decided upon.

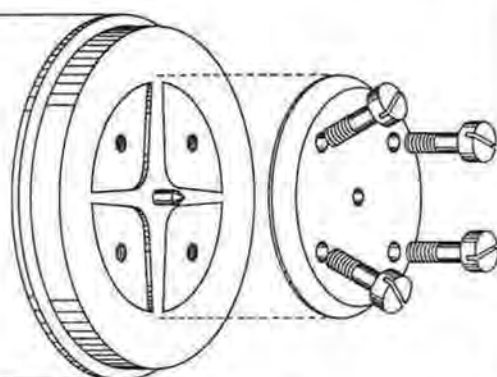
HOLDING THE ESCAPE WHEEL BLANK

Figures 4 and 5 show methods of holding the escape wheel blank when doing the necessary operations of making the cylinder escape wheel. The method of holding the blank while working on the upper side of the blank is shown in Figure 4. This holder is made on a cement brass or a brass rod which is at least the diameter of the bottom of the wheel blank, as shown. If a brass rod is used to make the holder, the rod is turned down on one end to fit closely in a wire chuck. After this, the rod is chucked true in the lathe. Then the end of the rod is faced flat. Next, a hole is drilled in the end of the rod for a center pin which will go through the center hole in the wheel blank. The pin can be slightly too large for the hole in the blank. Now, after the pin has been staked into the holder, it is turned down true to fit the hole in the wheel blank. A brass end cap is made to hold the wheel blank tightly to the end of the holder. The cap should fit closely inside the wheel blank and should be held in place by four screws as shown. The center hole in the end cap should be just large enough to go around the hub of the wheel.

The holes in the end cap are drilled first to fit the body of the screws. Then the holes are drilled and tapped in the end of the holder. The milling attachment is used for holding the drill when drilling the holes in the holder and also for tapping the holes.

The holder shown in Figure 5 is used for holding the wheel blank when working from the bottom of the wheel. The brass rod from which this holder is made is at least as large as the diameter of the wheel blank. A shoulder is turned on the rod to fit the inside diameter of the escape wheel blank and at a length which would allow the rim of the blank to rest on the shoulder of the holder.

Figure 5



The inside of the blank should be just short of resting on the end of the holder. This assures that the rim of the blank will be supported firmly against the shoulder of the holder to support the blank while the "U" spaces are milled out. The end cap is slightly larger than the opening in the blank for the spokes. The outside corner of the end cap is beveled to allow more visibility when milling the "U" spaces.

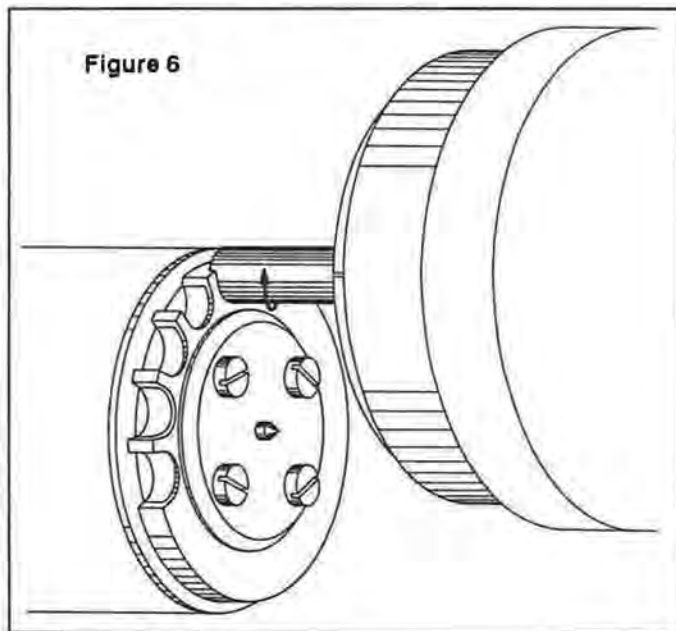
MILLING THE "U" SPACES

Figure 6 shows the "U" spaces being milled. The blank is held on the work holder shown in Figure 5. One should make sure that the blank runs true and is tight on the holder so it will not shift during the process of milling the "U" spaces. The "U" spaces are milled just to the rim of the blank. The milling cutter is held in the spindle of the milling attachment and is turned in the direction of the arrow. The blank is indexed by the use of an index plate on the lathe spindle and an index latch fastened to the end of the lathe bed.

CHOICE OF CUTTER FOR MILLING THE "U" SPACES

Figure 7 shows four milling cutters. The cutter in View A has teeth only on its end. This is perhaps not the best selection for milling the "U" spaces. This style of cutter has

Figure 6



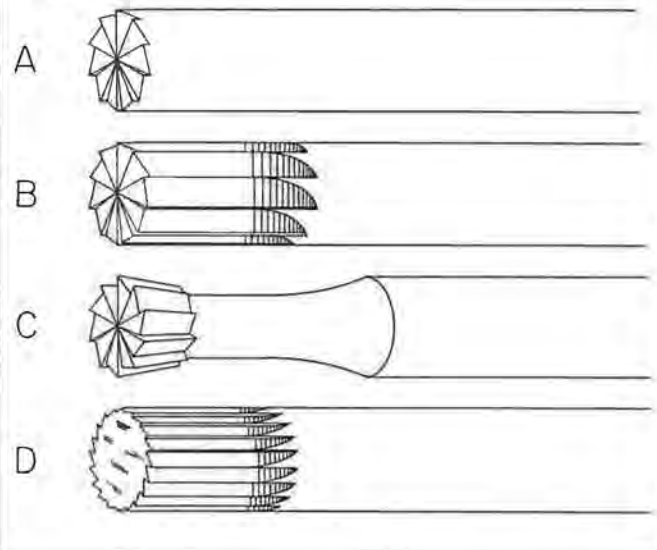
a tendency to travel toward the path of least resistance since it does not cut on its body. Note: Since these cutters do not have a pilot to guide them, they tend to travel to one side when being used, especially if they are forced to cut. This cutter does not eliminate its shavings as well as a cutter which has teeth on its circumference as well as on its end.

The cutter shown in View B, Figure 7 would be more highly recommended for milling the "U" spaces. This cutter has teeth on its circumference as well as its end. A very important thing to remember when making one of these cutters is that the teeth on the end of the cutter should be made so they point to the exact center of the cutter. If the teeth do not point to exact center, the cutter has a tendency to pick up some of the brass that supports the blank and the cutter stops cutting until the brass is removed from the end of the cutter. Some cutting oil should be used on the cutter when the "U" spaces are being milled. Also, beeswax makes a good lubricant for milling.

View C, Figure 7 shows another cutter that can be used for milling the "U" spaces. This is a dental type drill or burr. This cutter does a good job. The main disadvantage with this style of cutter is that it has a thin neck back of the cutting head which makes the cutter weaker. This requires that the cutter not be forced to cut. The cutter must be fed slowly. An advantage to this style of cutter is that the cutting head is tapered which gives it more cutting clearance.

View D, Figure 7 shows a milling cutter with teeth

Figure 7



on its circumference only. The end of the cutter is flat and smooth. This cutter is used for rounding off the tooth pillars after the "U" spaces have been milled.

MILLING THE INDEX NOTCHES

After the "U" spaces have been milled and before the blank on its holder has been disturbed, one should use a circle saw in the milling attachment to mill shallow index notches in the rim of the wheel in the center of the "U" spaces. These

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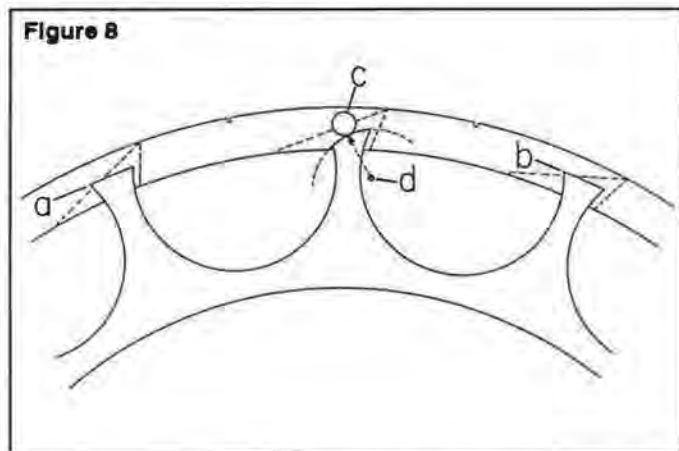
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notches will be used to index the wheel when the pillars are rounded. Note: When cutting the index notches, the circle saw is centered with the point of the center pin in the work holder.

ROUNDING THE TOOTH PILLARS

Figure 8 shows the reason for rounding off the pillars of the escape wheel teeth. The escape wheel teeth are shown in dashed lines. Views "a" and "b" show how the corner of the pillar extends out past the incline plane of the teeth. This corner must be cut back and rounded for two reasons: (1) To prevent the corner from catching on the cylinder during impulse, and (2) to help prevent the oil from leaving the teeth of the escape wheel.

View "c", Figure 8 shows an end view of the cutter used to round the pillar, and View "d" shows the radius pivot point around which the wheel is manipulated while the cutter is rounding the pillar.

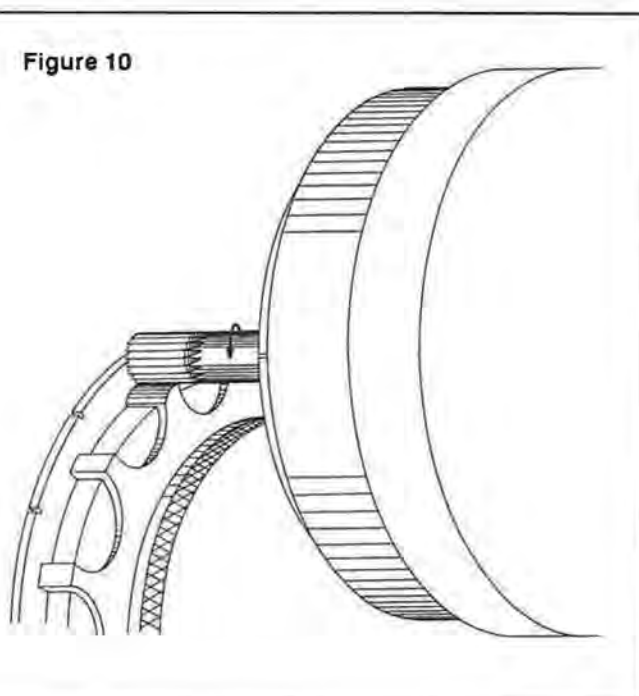
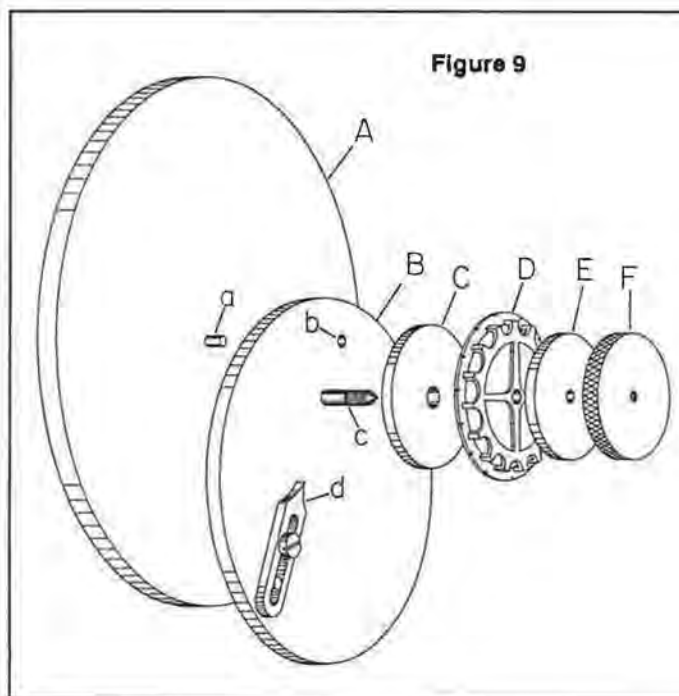
WORK HOLDER FOR ROUNDING PILLARS

Figure 9 shows an arrangement used to hold the cylinder escape wheel while the pillars are being rounded. View A

shows a face plate which is mounted on a lathe chuck that fits into the lathe spindle. This plate has a pin frictioned into its surface which is shown in View "a". This pin goes through a hole in the work plate B of the arrangement. Work plate B holds the escape wheel while the pillars are being rounded. The work plate is pivoted on pin "a" of the face plate. Hole "b" in the work plate is drilled in the proper position to allow a specific radius to be milled on the pillars. Pin "c" on the work plate holds the escape wheel. The wheel is supported on washer C. Washer C fits inside the escape wheel and is of a thickness to allow the rim of the wheel to rest on the work plate. The escape wheel is shown in View D. Washer E goes against the bottom of the escape wheel. View F shows the threaded nut which screws onto the end of pin C to hold the escape wheel solid while the pillars are being rounded. Index arm "d", which is attached to the work plate, is used to index the wheel each time a pillar is rounded.

Figure 10 shows a close-up view of a pillar being rounded off. The milling cutter is used in the milling attachment spindle. The cutter is shown in a position which is at the end of the process of rounding the pillar. In other words, the rounding of this particular pillar has been completed. At this point, the work plate has been swung to the right on its pivot pin as far as is needed to round off the pillar. One should have adjustable stops on the vertical slide of the milling attachment and on the longitudinal slide of the slide rest to set the position of the milling cutter. The cutter should turn in the direction of the arrow. The teeth on the cutter should point toward the pillar at the start of the cut when the cutter is on the other side of the pillar. After rounding one pillar, the nut holding the wheel is loosened while the wheel is indexed to a new position. Then the nut is retightened. This is repeated until all pillars have been rounded.

Next month the teeth will be made on the wheel and the wheel will be finished. □



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Ask Huck

CLOCKMAKING BITS

By J.M. Huckabee
CMC, FBHI

About . . .

AMERICAN CLOCKS WITH HALF DEADBEAT ESCAPEMENT



Q. What is the correct action and purpose of an American half deadbeat strip pallet escapement? Are both pallets supposed to recoil equally, or does the entrance pallet act as a recoil pallet and the exit act as a deadbeat pallet?

The answer to this question requires more space than we usually devote to answers; therefore, we will deal with this one question only in this month's column.

A. For many years I have looked upon this type of escapement with a capricious attitude--as a device with little more excellence than a poorly made deadbeat escapement. I have judged this as more delicate than the strip pallet of the recoil type and not much better timekeeper.

This question prompted a search of literature for some real technical answers. Here is what I found:

Reference 1: Claudius Saunier has a lengthy description with very little real detail: "What is known as the half deadbeat or half recoil anchor from the fact that the recoil occurs against one of the pallet arms, the wheel resting on the other arm against a locking face concentric with the pallet axis . . ." and further, "The escapement can only with great difficulty be made of large dimensions so as to be used with a spring suspension and heavy pendulum . . ."

Reference 2: Only one sentence appears in Britten's *Watch & Clockmakers Handbook, Dictionary & Guide* as revised by J.W. Player, FBHI: "A clock escapement in which there is little recoil."

Reference 3: W.J. Gazeley has this to say: "Figure 62. The half deadbeat escapement is a very fine escapement for shorter pendulums. The impulse is the same as the deadbeat, but locking only in recoil, and deadbeat is superimposed."

Reference 4: In another text Gazeley says: "For clocks with half seconds or shorter pendulums, an

escapement termed half deadbeat is used . . . locking faces are curved to introduce recoil. The half deadbeat possesses the advantages of the deadbeat and recoil escapements."

Reference 5: Haswell has this comment: "The half deadbeat escapements referred to in the tables are occasionally met with in clocks constructed for use with half seconds pendulums . . . constructed with a partial recoil, thereby tending to alleviate the effect of any mechanical faults in the train."

Thus far we find our escapement is a hybrid of the deadbeat and recoil types with no exact form, and with some imaginary value! A poorly made escapement of either style may fit the description.

Now let's go to the best text I can locate, our own *AWI Questions and Answers of and for the Clockmaking Profession*.

Reference 6: James L. Tigner, CMC wrote the sections on "Adjusting the Recoil Escapement," "The Graham Deadbeat Escapement," and "The Strip Pallet Half Deadbeat Escapement." This work is by a craftsman with extensive theoretical and practical skills! The illustrations and text cover the subjects on pages 156-188. Tigner relates the fine art of adjusting our subject escapement and the excellence that can be achieved. This is a text every student and craftsman alike should own! His illustrations and text pretty much parallel my experience with the old American clocks. Most of the recoil from the half deadbeat escapement occurs on the entrance pallet. Let's let Tigner's work teach us!

Most of our problems can be solved within the skills of AWI members!

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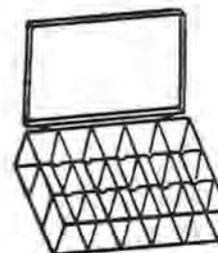
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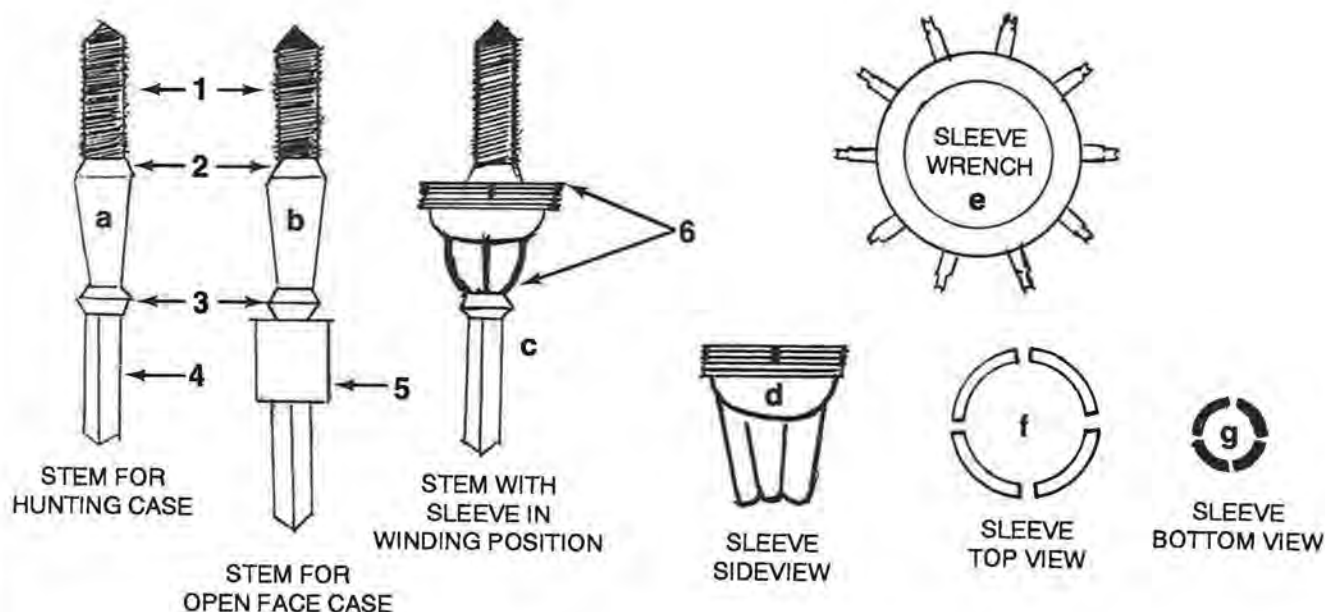
MARSHALL F. RICHMOND
CMW

There are several types of mechanisms used in pocket watches for winding and setting. They began with the key wound, and the pendant was used with a bow for attaching a chain or thong for security. Watch fobs were at one time popular; they were only good for grasping and pulling the watch from the pocket or for ornamentation. They serve no security function because the fob does not attach to the clothing. Detent type setting devices were used in many pocket watches. They could be removed by loosening the detent screw, thus allowing the detent to back out from the groove in the stem, thus freeing the stem for removal. This type was used extensively in most wristwatches, both ladies' and gent's, and in American as well as foreign made watches. In recent years the detent screw has been replaced with a pin that can be pushed with a sharp-

pointed instrument against a spring which releases the stem for removal. The stem has a taper before the groove for the detent which allows the stem to be replaced by simply pushing it in and letting the detent snap into the groove. In many of the old cases, where the setting was done by a lever and the stem was used for winding and setting, the stem remained in the same position and was held in with a screw from the outside of the pendant which was between the crown and the case. Probably the most used and most troublesome was the stem and sleeve type cases. They allowed the stem to snap into two positions for winding and setting.

Hunting case watches (when the lid is closed) can be opened by pressing the crown past the winding position which releases the catch. In recent years there has been many hunting case watches appearing on the

Figure 1



market. Many of them are inexpensively made movements and the cases made of a base metal; these cannot be repaired if heat is involved. The stem usually works with a detent in the movement. It shifts the mechanism from winding by pulling the stem out to set hands and pushing it in to wind. The crown is a specially made one with a button in the end that is pushed to trip the catch holding the lid allowing it to open. Between this button and the crown there is a piece of tubing that allows the button to connect with the catch spring. When the movement is being removed from the case, this tube can disappear if not watched closely. If not found, a new one can be made from a piece of tubing of the proper diameter. I believe that now the material suppliers have an assortment of these types in popular lengths.

Key wound pocket watches were among the first watches made and many are in running condition today due to the knowledge and skills of watchmakers who repair and restore antiques. Key wound watch cases are nearly trouble free. Occasionally a crystal is broken or a key is lost. Crystals can be replaced but sometimes plastic is all that is available. Keys can be replaced as they are available from the watch material suppliers. Since there are several different size squares, the correct measurement should be given with the order. In many cases the key is also used to set the hands, so this square should be checked also because I have found the squares to be different sizes; then two keys were required--one for winding and one for setting.

Cases using a detent type movement are almost trouble free of case repair except for broken crystals and possibly wear in the bow ends or the ends of the pendant where the bow ends seat. If the bow ends are worn, the bow can be replaced since bows are available from the material suppliers. If the seats in the pendant aren't worn too badly, sometimes they can be filed and the hole re-drilled to a depth to accommodate the new bow ends. If worn too badly, a piece of metal can be fit on each end, hard-soldered in place, then shaped by filing and drilling the ends to a depth to accommodate the new bow. These can be shaped and polished to look the same as the original when it was new. This method of hard soldering will work on any metal that can be heated enough to flow hard solder, except in the case of some alloys that solder will not flow on regardless of what flux is used.

In replacing worn or broken crowns there is more than one style used. It is best to try and duplicate the old crown if it is available and in good enough shape to measure. In replacing the stem, even though the stem to fit the movement is usually plenty long, sometimes they are not long enough. Stem extenders are available in most tap sizes or combination of tap sizes. Fitting stems in this type movement is more of a movement repair than a case repair.

Stem and sleeve type open face watches are different from hunting case watches because opening the lid to tell the time does not have to be considered in fitting a new stem or in making sleeve adjustments. In replacing a damaged or broken sleeve, I have not



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found a listing of case parts, so one can be ordered by watch make or model or case make or model. I have a Newall assortment in a leatherette cabinet and I pick (by eye) a look alike, measure the thread diameter, snap hole in the lower end and length. Usually the correct one is chosen on the first try; if not try again. If no identical one can be found, one with the same measurements in thread size and hole size but overall shorter or longer may be made to work. The threads inside the pendant often go pretty deep which gives as much as 3/16 inch shallower or deeper adjustment.

If this does not work and an identical sleeve cannot be obtained by sending the sample to the material house, another alternative is to change the stem. This usually requires some alterations with the lathe because a stem with the exact measurements may not be found. I have a 120-bottle drawer cabinet of pocket watch stems plus several bulk assortments and I still usually have to alter. Pocket watch stems for sleeve type come in squares for 0/s, 3/s, 6/s, 12/s, 16/s, and 18/s watches. Sleeves also come with threads for all sizes and different size snap holes.

The stems also have different thread sizes for different crowns. I have a listing for Newall yellow antique crowns which lists thread sizes 18, 16, 6, 0 and nit. Their nickel antique crowns, nickel round antique crowns, and their yellow antique round crowns list a tap size instead of a thread size. Taps are listed as 0, 1, and 2 which fit cases for 18/s and 16/s movements. In fitting these stems with sleeves, the square can sometimes be cut off to match the winding and setting mechanism of the movement. Thus when the stem is snapped down, the movement winds, and when snapped out the movement's hands will set. The crown must be fit so it will let the movement wind when snapped in but will be deep enough for the recess to fit well down on the tube that houses the sleeve.

Stem and sleeve type hunting case watches are the same as open face mechanisms except they have a larger diameter hub between the switching shoulder and the square. This hub is what releases the catch that holds the lid over the dial, hands, and crystal in its closed position. The square goes through the spring which the catch is a part of; it is used to operate the winding and setting mechanism so when installing the crown, enough room must be left so that when in the winding position the crown can be pushed in a little farther to release the catch.

Figure 1 shows (a) stem for open face case, (b) stem for hunting case, (c) stem with sleeve in winding position, (d) side view of sleeve, (e) sleeve wrench, (f) top view of sleeve, (g) bottom view of sleeve. Points (1) shows threads for crown at top of stem, (2) taper cut at bottom of threads to spread sleeve when installing, (3) switching shoulder, (4) square, (5) shoulder for releasing catch holding hunting case lid closed, and (6) sleeve installed on stem for open face case.

Installations, repairs, and adjustments on stems, sleeves, and crowns require much ingenuity and skill. There is no set procedures that I know of. It

requires a good understanding of not only the mechanical workings of the stem and sleeve, but also of the mechanisms in the movement. Most of these are different but give the same results by placing it in the winding position when the stem is pushed in and in the setting position when the stem is pulled out. The sleeve should be tight enough on the switching shoulder so as to require enough pressure when pulling it out in the set position that it will not slip into this position when winding. It should snap in smoothly when put into setting position. One tip for making this a smooth snap is to lubricate the switching shoulder with a good stem grease.

A sleeve wrench with 10 size ends will fit most all sleeves. The sleeve can be screwed down into the pendant threads to a depth that will allow the stem to wind when pushed in and set when pulled out. If a new stem is being fitted, the square is possibly too long. If the sleeve is screwed halfway into the threads in the pendant, the square can be cut to the correct length which leaves the adjustment at the halfway point. It can then be moved either way for fine adjustment. The threads on the stem for the crown should not be cut off until last, then cut to the proper length for the crown to fit properly.

Pocket watch crowns are made in several styles: antique (which are flat on top), full round, fancies for later model watches in sizes for 18/s, 16/s, 12/s, 6/s, 0/s and 3/0 s with the stem posts tapped for nit; 0/s, 6/s, 12/s, 16/s and 18/s threaded stems. Almost all pocket watch crowns are recessed some with flush posts, some with the posts halfway into the recess, and some protruding (long post). Recesses have various size openings to fit the outer diameter of the pendant tube. These openings are measured in millimeters, some as small as 3-1/2mm for nit size pendants to 9-1/2mm on some round crowns for 18/s movements. Having a two-drawer assortment each with 90 bottles of pocket watch crowns, I have been able to fit every pocket watch brought to me for this repair in the last 40 years. With different depths and tap sizes, much manipulating can be done in working with pocket watch cases.

Pocket watch winding and setting problems should be carefully diagnosed before starting any extensive repairs. Sometimes the problems can be corrected very simply. For instance, if the watch sets properly and slips a little when winding, it could be that the stem is too short and a 3 or 4 minute timing washer put in the opening in the movement for the stem square will give enough extra length to the stem to correct the slippage. It is best in diagnosing to determine first if the problem is in the mechanism of the movement or in the stem mechanism. Sometimes a crown will not allow the stem to go deep enough to wind properly. By removing the crown and dropping a small piece of metal in the stem hole, it will cause the crown to stand out far enough to engage the winding mechanism.

In the next article, working silver will be the main topic of discussion.

□

Affiliate Chapter Column

Convention Planning

Greg Hostetter, CC

For many of the affiliate chapters, putting on an annual convention is their biggest project of the year. Every year, we each try to improve on the conventions of the past and give more to our membership. After many years (some affiliates have held conventions for over 60 years) it can be difficult to come up with new ideas and attractions. So just what can you include in a convention to interest and educate your members while at the same time offering a welcome social atmosphere?

Location: Some affiliates hold their convention at the same hotel on the same weekend each year. Here in Minnesota, we hold our convention in Bloomington on the last weekend in February. We've been at the same hotel for as long as I can remember. Since our membership is drawn primarily from the Twin Cities area, it makes sense for us to hold our convention near our membership.

Other affiliates such as the Wisconsin Horological Society move their convention to different cities around the state. Instead of drawing their membership from just one metropolitan area, they draw mainly from two different areas of the state. By moving the convention around, the convention is brought to the membership pockets while providing a little variety to the convention atmosphere.

Another affiliate transfers responsibility for the convention between the several guilds in the state. This not only moves the convention around, but provides new ideas and input.

Since affiliate conventions run from one to three days, there are a variety of activities that often take place.

Social Programs: A convention is not only an educational event, but it gives members a chance to meet old and new friends. Banquets, dances, golf outings, and similar events all give members a chance to relax and socialize. Tours and excursions are also a part of many conventions. Sometimes it's a tour of a local material supplier or local service center.

Some affiliates invite local material houses to set up a display of their products. This not only allows everyone to see the new products available, but also allows them to see the faces behind the voices at the supply houses.

Auctions are gaining in popularity for many affiliate chapters. An auction provides a good opportunity for members to part with tools and other items no longer needed in a fun social atmosphere. Many chapters have found this to be a good source of revenue, too.

One idea that we in Minnesota borrowed from another affiliate chapter was to hold a watch timing contest. It was a simple contest where prizes were awarded for the watch that timed out best in six positions. This gave our members a chance to show off their skills while having a good time.

These are just some of the many different activities that take place at local conventions. Next month, we'll discuss the most important feature at affiliate conventions: seminars and workshops.

□

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Timelocks

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David A. Christianson
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With this article we will examine a very lovely little antique timelock movement that dates to the 1880s (Figure 1). This very finely made timelock was made for Hall's Safe & Lock Company of Cincinnati (probably by the Consolidated Timelock Company of neighboring Hamilton, Ohio). It was classified as a burglar-proof timelock and undoubtedly controlled a combination lock made by Joseph Hall as well as being sold to other safe and vault companies to be used with their combination locks.

The real beauty of this timelock is, of course, in its movement (at least in the eye of the watchmaker). The movement was made by the E. Howard & Company of Boston for the Consolidated Timelock Company under the H. Gross patent of February 8, 1876. It is undoubtedly one of the most intricately designed and finely crafted of the timelock movements.

This information is a bit conjectural, since only the name of Hall's Safe & Lock Co., the name of E. Howard, and the H. Gross patent date appear on the timelock. This is the tangible evidence found on the movement, case, and locking mechanism. Considered intangible are the numerous other patent dates located on the outside of the case. A search of the U.S. Patent Office's records reveals no additional information, although, as they explain, the search was made only for information on timelocks and watch and clock patents of

these dates. Perhaps a search into locking mechanisms and vault locks might reveal more.

However, two illustrations found in the book *The Lure of the Lock*¹ do help us surmise or perhaps formulate some more information on this timelock. Figure 3 illustrates a timelock labelled the Hall's Chronometric Time Attachment in Mr. Mossman's book *The Lure of the Lock*. He states that this timelock was made by Joseph L. Hall of Cincinnati, and that it is "a burglar-proof timelock for use in a vault or safe." Figure 4, also in Mr. Mossman's book, illustrates the Consolidated Time and Herring-Hall-Marvin Combination lock. As he states, "It is a combined time and combination lock. The timelock is a single lock chronometer made under the Gross patent. The movement was made by E. Howard & Company of Boston. The combination lock is J.L. Hall's patent 'Premier' . . ."

Just by comparing Figures 1, 3, and 4 and Mr. Mossman's data allows us to surmise that the three aren't only similar but are of the same origin, namely the Consolidated Timelock Company of Hamilton, Ohio; J.L. Hall and his successor company, the Herring-Hall-Marvin Safe Company of Cincinnati were safe-makers, not makers of timelocks.

Henry Gross, under whose patents all three of these timelocks were made, was an early and very



Figure 1. A Consolidated Lock Company dual movement timelock, circa 1880. Made for Hall's Safe & Lock Company of Cincinnati.



Figure 2. The Consolidated Timelock with its front cover removed. Note the glass apertures at the top of the case, which allow viewing of the two independent balance wheels.

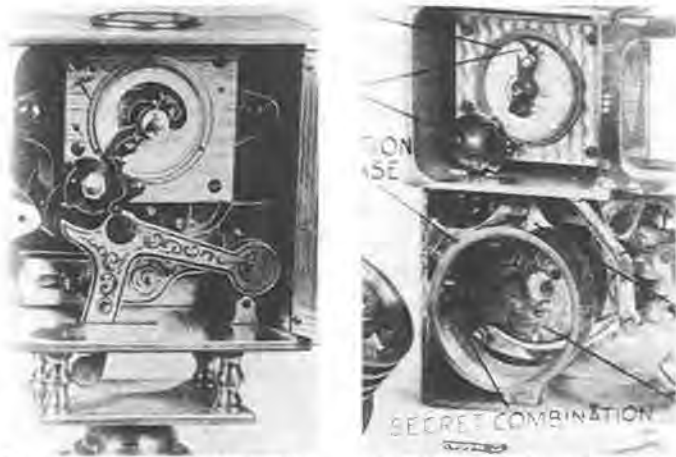


Figure 3 (above left). Hall's Chronometric Time Attachment made by Joseph Hall of Cincinnati. Figure 4 (above right). Consolidated Timelock atop a Herring-Hall-Marvin combination lock.

prolific inventor of timelocks, both movements and locking mechanisms. Mr. Mossman, from whose book we are referencing, was a very successful salesman and distributor of locks, combination locks, and timelocks around the turn of the century. He not only sold these early mechanisms but was a contemporary of these many early timelock inventors and makers, as well as having a personal knowledge of many of them. His large collection of locks, which included many early timelocks, was published in 1928.



Figure 5. The contrate 5th wheel that transfers power from the train to the platform escapement.

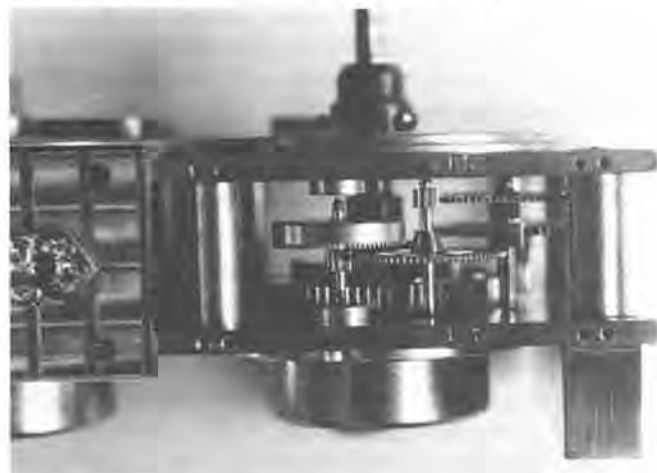


Figure 6. A top view of one movement with the platform escapement removed and revealing the contrate 5th wheel.

KEY TEST FOR QUARTZ WATCHES

The "KEY TEST FOR QUARTZ WATCHES" by Ewell Hartman, CMW is a quick and simple method of locating the problem in a quartz analog movement. The only tool required is a meter.

Material and instructions for learning this test are supplied by the AWI-ELM Trust as part of their educational work. There is no charge to any group wishing to learn this test. There are great benefits to learning this in a group setting. However, for individuals who may not be able to participate in a group, it is available to them also.

For more information call or write the AWI office for an information sheet and application form.



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THE MOVEMENT

The same very fine craftsmanship and detail that made E. Howard & Company the foremost watchmaker of its time is immediately apparent in this timelock movement.

The movement might be classified as a carriage clock pattern design. This pattern was consistently used by the Consolidated Timelock Company in which the escapement is mounted on a platform on top of the movement and at right angles to the train. The power itself is transferred from the train to the escapement and balance through a contrate 5th wheel (Figure 5).

Figure 6 shows the platform removed and reveals the contrate 5th wheel in the movement. Figure 7 shows one of the two indicator hands and dials removed and Figure 8 reveals the movement wheel train after the front plate has been removed.

Several items should be noted in Figure 8:

- Notice that the barrel arbor is in the center of the movement, and the time indicator arm, which also acts as the timelock trip lever, attaches to this arbor--the arbor making one full revolution every 48 hours.
- The barrel arbor's ratchet wheel is on the inside of the movement and is virtually impossible to release when the movement plates are assembled.
- The 3rd and 4th wheels have been lightened considerably by drilling additional holes into their rims. This undoubtedly was done to lighten the wheel weight, to help reduce the resistance to starting the escapement motion, and to help give an instant start to the balance when power is applied to the mainspring. Other factors, such as correct pallet lift angles and a correct in-beat condition enter into giving this needed "instant start" to the balance wheel.
- The solid contrate 5th wheel transfers power 90° to the escape wheel pinion extending down from the platform.
- Note also the platform escapement attaches to the top end of the movement plates.

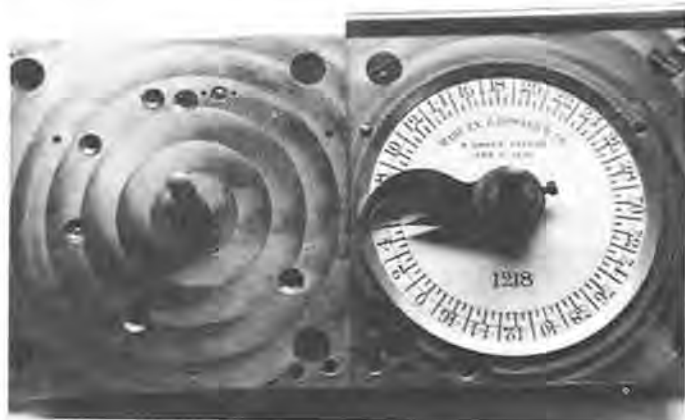


Figure 7. The front of the dual movement with one of the two indicator hands and dials removed.

With the movement housed in its timelock case (Figure 1), Figure 9 shows a top view of the case with the two glass apertures revealing the two movements' balance wheels. Figure 10 shows the top side of this dual movement after it has been removed from its case. Figure 11 shows a closeup of one of the E. Howard platform escapements.

Figure 12 shows the back side of the movement with its two independent mainspring barrels. Figure 13 shows the barrel arbor, main wheel, and ratchet wheel.

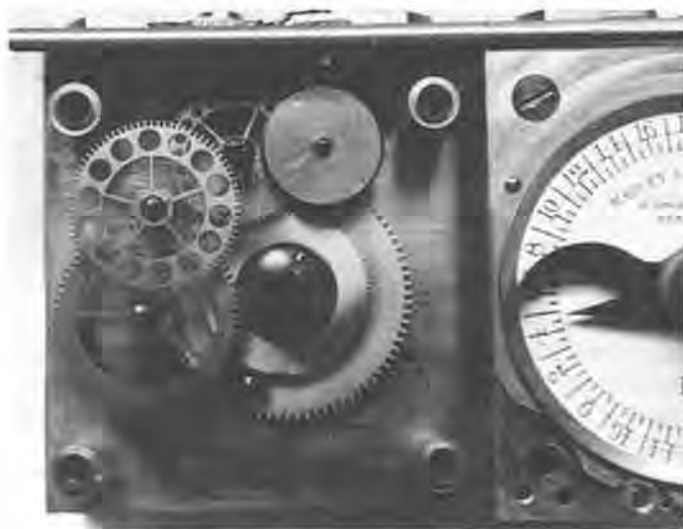


Figure 8. The dual movement with one of the front plates removed showing the power train.



Figure 9. Top view of the case with the two glass apertures which allow viewing the balances.

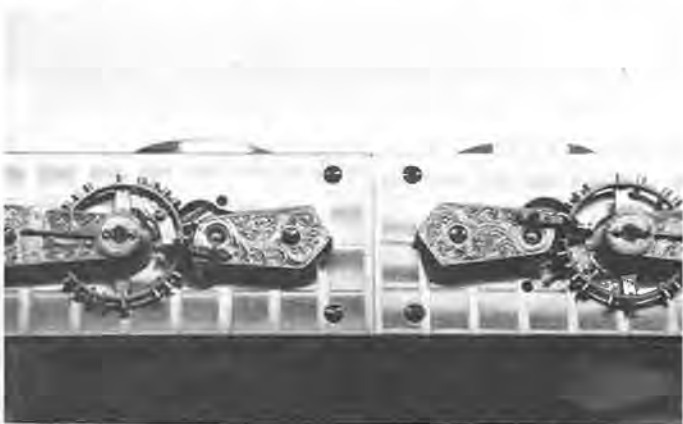


Figure 10. Top side of the movement after being removed from the case.

assembly removed from the barrel. Note the very large, mushroom-shaped mainspring hook that keys into a vertical slot in the barrel side. Figure 14 shows removal of the mainspring using a mainspring winder. Here you can see (if you look closely) the spring hook attached to the mainspring and the key slot in the barrel wall. Figure 15 shows a better view of the mainspring with its hook and the hook slot in the barrel wall.

DISASSEMBLY

1) Remove the four movement retaining screws located on the back side of the timelock case. The movements, as one unit, are suspended inside the case by these four screws and will drop out of the case when the screws are removed.



Figure 11. Closeup of one of the E. Howard platform escapements.

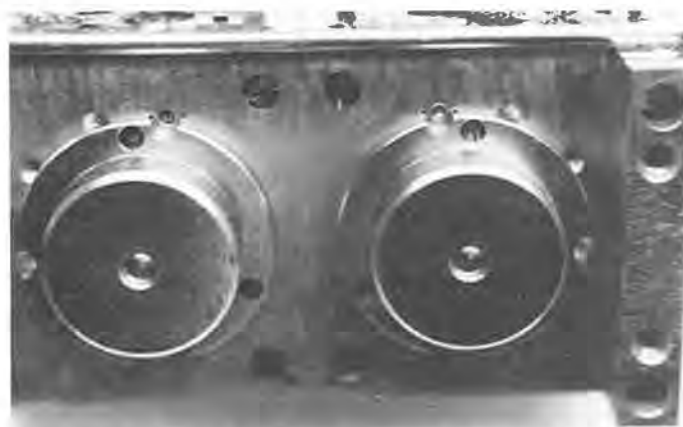


Figure 12. Back side of the dual movement with its two independent mainspring barrels.



Figure 13. The barrel arbor, main wheel, and ratchet wheel assembly removed from the mainspring barrel.

With the movements removed, you will see that the two movements share the same back (or pillar) plate.

2) To release power on each train, block each train in turn with a piece of Rodico®, or with your thumb on the 2nd and 3rd wheels. Loosen and remove the platform escapement. Slowly let down the power by controlling the speed with a bench key on the winding arbor and your thumb on the 3rd wheel.

3) Remove the indicator hand from each winding arbor (held on with a set screw).

4) Remove the two dials which are held in place with three dial screws each.

5) Remove the two front plates by removing their four pillar screws each. The trains are now exposed and the wheels can be lifted out and examined.

6) Remove the winding arbor/mainspring assemblies by twisting them counterclockwise to unhook the inner terminal of the mainspring.

7) Remove the three barrel retaining screws on each barrel and they will be free of the main plate.

8) Using a mainspring winder, remove the mainsprings from their respective barrels.

9) Disassemble the platform escapement assemblies as you would any pocket watch. The balance, pallet



Figure 14. Removing the mainspring using a mainspring winder.



Figure 15. View of the mainspring with its large mushroom-shaped hook attached to the end of the mainspring and the attendant hook slot in the barrel wall.

fork, and escape wheels are the same size as an 18-size pocket watch and every bit as delicate.

CLEANING PROCEDURE

1) Preclean this dual movement completely disassembled, keeping parts from each movement separated. Precleaning can be accomplished using either ultrasonics or by hand using a presoak in a good metal degreasing solvent, followed by a thorough scrubbing in a recognized watch cleaning solution. Rinse completely and dry.

2) Movement inspection and repairs are done at this point followed by the checking of train sideshake, endshake, and freedom.

3) Re-clean the entire disassembled movement using any acceptable watch cleaning method. Rinse with a commercial watch rinse solution, and dry using heated, moving air to prevent any residue from forming on the movement plates and components.

4) Peg each pivot hole and jewel hole completely using frequently resharpened pegwood to provide thoroughly clean pivot hole surfaces.

5) Clean each pivot in pithwood and inspect and clean all wheel and pinion teeth by passing through pithwood if needed.

6) Completely disassemble the balance hole/cap jewel assemblies. Clean in One Dip® hairspring cleaner, blow dry, and scrape and peg the hole and cap jewels with pegwood.

7) Clean the balance wheel and hairspring assembly in One Dip® hairspring cleaner and dry in clean, sifted jewelers sawdust.

8) Wipe the mainsprings with a solvent-soaked cloth and dry by pulling the springs through a clean, dry, lint-free cloth, being sure to use a clean section with each pull.

REPAIR NOTES

A. In theory, the train wheels are interchangeable from one movement to the other within this dual time train movement, but in practice it is advisable not to interchange them from one train to the other. These parts have "worn in" over the years, and even with new bushings, pivots, and/or jewels, the wear on pinion leaves and teeth, along with slight and even imperceptible differences in pivot hole locations, could and would cause unnecessary problems.

B. Slight differences in pivot hole locations make interchanging parts from the left platform to the right virtually impossible without major reworking of the components. Apparently, these movements, although mass-produced, were hand-fitted and hand-adjusted.

C. Because of their age, these movements will definitely require thorough cleaning and rebushing of pivot holes along with the possible replacement of cracked pivot jewels. However, because these magnificent timelocks were in service during the time of regular, periodic, and professionally applied service, and were taken out of service before more sporadic servicing was practiced, most of these movements will probably require little else to restore them to their former state of excellence. (See the *Horological Times*, September 1989 and August 1991 for past and present servicing

techniques.)

D. *Reserve power*: This is the partially prewound mainspring condition that stores potential energy to insure instant starting and avoid a more rapid time loss as the spring relaxes to a full state of rest. See the following section, paragraphs 11 and 12.

REASSEMBLY PROCEDURES

1) Lubricate the mainsprings by wiping with a quality mainspring grease (by hand) and reinsert in their respective barrels using your mainspring winder.

2) Install the lubricated mainspring barrels onto the back side of the lower movement plate and insert the mainspring arbor/main wheel assembly into the barrel from the front side of the plate, being sure that the inner terminal of each spring curves snugly around their respective arbors and being sure that the hook on each is hooked into the inner terminal holes of the mainsprings.

3) Lubricate the main wheel ratchet teeth.

4) Assemble the train wheels into the lower plate and install the upper train plate into position. Check each wheel for its proper endshake and each train for freedom.

5) Put the escapement into theoretical beat by arranging the balance jewel pin and pallet fork slot on a line of centers between the balance pivot and the escape wheel pivot.

6) Lubricate the platform escapement pivots and balance pivots using a high-grade watch oil. Remember to put a light touch of oil on the face of pallet stones and three teeth of each escape wheel.

7) Install the two escapement platforms, gently sliding them into place so as not to damage the escape wheel pinion and the 5th wheel teeth as they mesh together.

8) Lubricate the train wheel pivots with light clock oil, including the winding arbor pivots.

9) Prewind the two mainsprings two full turns of the winding arbor. If the repairs are done correctly, both movements will start running.

10) Wind each movement four more full winds and adjust the timing rates on the rate recorder with the movements in a vertical (normal operating) position.

11) Wind each movement fully and recheck the timing rate.

12) The dials and indicator hands are now placed on the movements so as to indicate the maximum (48-hour) running time. This will allow a prewind on the mainsprings when the hand runs down to zero and stops.

13) Allow the movements to run for the full 48 hours, periodically checking the time indicated by the dials to assure proper functioning.

14) Dry clean the timelock case.

15) Install the movement into the case.

16) Wind the movements fully, set the dials to a few hours of running time, and allow the movements to run down to zero, checking the rates one last time.

□

WATCH INSPECTION TIME

March 14-19, 1994

*To take advantage of this promotion, contact AWI Central for your **FREE Watch Inspection Promotion Kit!***

The Kit includes:

- ✓ *A placard for your window or shop counter*
- ✓ *Two radio scripts promoting a free watch inspection (30 seconds each)*
- ✓ *Small newspaper ads*
- ✓ *A proof to print direct mail announcements*

Bring customers into your shop during this special promotion period at a time when the impor-

tant gift-giving season is approaching. Your customer will have an opportunity to observe the professionalism of your staff and well-equipped service department.

Inspect the watch for wear, leakage, appearance, and band safety.

While your service staff is completing the inspection, your customer will have time to browse and inspect the merchandise you have on display in anticipation of the gift-giving season.

Try to display merchandise that is not seen in other stores. Select merchandise that will be saleable but not frequently found in competing stores. This will set you apart.

*During the inspection, your staff will have an opportunity to explain why your service and merchandise is different, and why they should come to you. **BE PREPARED!** Your staff should be prepared to offer ten reasons why this is true. Chances are, they'll only have time to discuss two or three-- but be prepared!*



WE'RE INTERESTED IN YOUR COLOR SLIDES

The American Watchmakers-Clockmakers Institute knows that there is a wealth of talent in its membership and that this talent is not only in the field of horology. There is seldom a gathering of a group of watchmakers and clockmakers where a camera is not also there.

Those of you who pride yourself in the beauty of your camera work can possibly participate in having your own picture reproduced on the cover of *Horological Times*. The covers of *Horological Times* are reproduced from color transparencies or slides. Remember, the format is scenery or nature and what you submit must be a color slide. Color photos are not acceptable.

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SCHOLASTICALLY SPEAKING

Kilgore College *Kilgore, Texas*



Toby Witherspoon

For hundreds of years, the only way to learn the watch and jewelry repair trade was for it to be handed down from family to family. Fortunately, that's no longer true today.

Throughout the United States, there are just a few schools that one may attend to get into these fields. One such school is Kilgore College, where I am employed as an instructor in the Watch and Jewelry repair course.

The Kilgore College Watch and Jewelry repair class has been at Kilgore College since 1947. There is a wide range of subjects offered in these fields.

We have an open entry program which allows a person to enter the first Monday of any month of the year. This makes it possible for someone to start as soon as possible, not having to wait until a semester starts. We are also equipped with the latest facilities for handicapped individuals.

In our jewelry and watch program, there is a one-on-one working relationship between the student and instructor. The student will start learning the names of the tools in the trade, along with shop safety. This is very important with today's OSHA standards.

In our jewelry program, our first projects will be very basic tool usage. Then we progress to soldering techniques which will lead to ring sizing. I still teach dovetail in ring sizing, because I want the students to be familiar with every possible avenue to do the job. The students will then learn half-shanking and manufacturing of wire. This wire is used in many heat-controlled projects using the torch.

At this point, the student will begin stone setting. I feel it is important to teach bright cutting with the gravers. Many people feel this is no longer necessary. I think it is important for many reasons. This technique opens a wide variety of graver usage. As a jeweler myself, just about every time I sit at the bench I will use my gravers for one thing or another.

Stone setting, retipping, repringing, and chain repair are also taught.

Designing and casting are taught last. Most students want to learn this first. However, not everyone has a 100% success rate in casting. If one were to cast a ring and a prong or shank does not come out, then he'd need to know how to half-shank or repring this ring so he wouldn't have to recast it.

In our watch repair program, we basically handle this in the same manner of order. From tools and shop safety, we do projects on the lathe.

The lathe has been a "sore thumb" for many students. Their story is: "Why learn to make parts when you can pick up the phone and *order* parts?" Once again, I feel that if one is going to call himself a watch repair person, he should have all knowledge of the field he is in. Also, the lathe, as a starter, will help train eye and hand coordination. This prepares them when they start disassembling and assembling tiny watch parts.

There are many steps before a watch is ever disassembled. These steps enhance the students' ability to understand the functions of a watch before the disassembling procedure, such as setting jewels, truing and poising wheels, staffing and hairspring work. After spending several months analyzing, cleaning, oiling, and timing mechanical watches, they will proceed to electronic watches.

To help prepare a student in the understanding of the electronic watch, the student will work on the Accutron first. This once again helps fine-tune the abilities of a student with precision.

In today's society there are approximately 70% quartz watches in flow. By the time a student reaches this stage, the most difficult part is understanding electronics. Students are very fortunate to have an opportunity to work on "live work" brought in from some 5,000 students and employees at Kilgore College. This is excellent training before going into the work force.

As an instructor, I feel it is important to produce a quality student and to share as much knowledge with each other as possible. In the past, watch repair has been known as a dying trade. I believe there to be many reasons for this. First, because for so many years this trade was handed down from family to family, this limited the amount of people entering the trade. Secondly, so many tradesmen were unwilling to share knowledge; and thirdly, there is a lack of exposure for schools and training facilities.

These setbacks are being overcome today through teaching facilities such as Kilgore College and the American Watchmakers-Clockmakers Institute. Through the help of such facilities and organizations, there are increasing amounts of interest building on a daily basis.

I feel proud to be involved in a field that is increasing in demand, and is training individuals to be self-supportive. □

Certification: Success or Failure

Marvin E. Whitney



Prior to the merger of the Horological Institute of America and the United Horological Association of America in June 1960, one of the primary objectives of the two organizations was to combat poor workmanship and to hopefully improve the ability of watch/clockmakers. One of the methods chosen to accomplish this was to grant certification status to its members who passed a proficiency examination.

When the two organizations merged in 1960, one of the main objectives of the newly unified organization, the American Watchmakers Institute, was to continue and promote certification, thus encouraging high standards of workmanship for watch/clockmakers.

The examination certificates are offered in several different grades and/or categories. The Certified level includes a range of work and knowledge not as advanced as that required for the Certified Master level. Examination procedures for all categories are identical, the only difference being the level of work required. All requirements, along with a list of suggestions to help one prepare for the examination, are clearly spelled out in the Examination *Prospectus*. The *Prospectus* lists such tasks as replacing the balance staff, setting up the escapement, truing the hairspring, replacing the fly tension spring or warning wheel pin, etc. This does not mean to imply that this is all that needs attention. These are only examples of what you may be required to do. You may find that a new regulator pin is required, a tooth needs to be straightened, the mainspring needs to be replaced or repaired, or the barrel or barrel arbor hook may need attention, or a variety of other repairs. The exam requires nothing different than what you may be required to do to a customer's watch or clock.

Certification is a great asset, and it's a shame that more craftsmen aren't certified. Yes, there are many craftsmen out there that do very competent work who aren't certified. Why? Most of them have not disciplined themselves to the point of taking few hours to study and take the examination.

I've been involved in certification for nearly 50 years. Ever since completing my watch/chronometer apprenticeship at the U.S. Naval Observatory, I've been involved in examining and testing timepieces. Whenever I've addressed the subject of certification before guilds, conventions, etc., there has been tremendous interest. Many people have come up afterwards, stating that they wished they had taken the time to become certified.

Thus, through the years, I've had the opportunity to examine and judge the workmanship of many examinees. The vast majority of the work involving the overhauling/repairing of the clock or watch, the lathework and the written portion has been most gratifying. More than 90% of them have received a passing grade. However, in the past ten years I've observed a decline in the quality of workmanship and the number who receive a passing grade. In some instances, the workmanship is so poor that it makes you wonder what the individual had in mind. I've always felt, and I am sure the majority of others shared

this same idea, that whenever one takes an examination, they made a sincere effort to do their very best. But from what I've seen lately, I'm beginning to wonder.

Surely one knows when the hairspring is not level, when the pivot has the proper shape, whether the chime barrel is synchronized with the locking plate, or when a wheel is bent. Frequently, when some of these individuals receive a failing grade, they become highly indignant and abrasive. They write that they've been repairing watches/clocks for "X" number of years, and can count on one hand the number of comebacks they've had per year, or that they never had anyone question their workmanship. This may well be true, but the evidence that was presented in the examination tells a different story. Those who feel that they didn't get a fair shake from the grader may request a second opinion from one of the other graders. When an examination is sent to the examiner for grading, he knows it only by a number. No other identification accompanies the exam material.

I'm going to critique various areas of several examinations, discussing why failure occurred. The Certification *Prospectus* clearly states what one should do in preparation for the examination--practice turning, truing hairsprings, reading several of the listed references. Most examinees do fairly well with the written or theoretical portion of the examination. The failures that do occur are in those areas dealing with the escapement, gear calculations, balance/pendulum functions, etc. These areas are well covered in the AWI Questions and Answers publications.

First, we'll turn our attention to the practical work: the overhaul and repair of the watches and clocks.

The *Prospectus* states that you should be able to handle a number of repairs. As noted, before you receive the test movement, you may find that some additional work may be necessary just as you may find with a customer's watch or clock. What do you do? Cry foul, or repair it? Would you tell your customer that because you found something unexpected to be wrong, you're unable to repair the timepiece? True, you may want to inform the customer that an additional charge may be involved, but I am sure you're not going to tell the customer that you can't handle it. If this isn't so, I'm afraid you won't be in business long. Each examination watch/clock submitted for grading should be in the same condition as one you are about to return to your customer--one which you are proud of and one which you are willing to stand behind.

Now for those areas which I have found through the years to be causes for failures. I'm sure that some of you who read this will do so in disbelief. Often the problems are so obvious that one doesn't need a loupe; they just jump out at you. Why anyone would submit a test watch or clock in these conditions baffles the mind.

Watches--Certified and Master

- 1) The balance out of true in round and/or flat--often, so much so that it rubs on the pallet bridge, center wheel, or balance cock when changed from a dial-up position to a dial-down position (or vice versa).
- 2) Hairspring out of true in the round or flat--often cupped up or down that it rubs on the balance arm or balance cock. Sometimes the stud is too high or low, causing it to be out in the flat.
- 3) Excessive endshake in the balance staff or pallet arbor.

- 4) The balance wheel out of poise--often during the poising operation on screwless wheels, the bit was allowed to drift off the edge of the rim.
- 5) Pallet blued from being overheated.
- 6) Slightly crushed or split roller table. Also, loose roller table.
- 7) Regulator pins open or the key is not returned to its proper position, allowing the hairspring to become free or a coil or two to catch on the key.
- 8) "Botching" up the replacement of a plate friction jewel, so bad that in several cases the watch had to be junked. Burrs not removed from around the reamed jewel hole.
- 9) Oil smears on jewels; fingerprints.
- 10) Loose screws--some may have worked out or were left loose to correct endshake, for when they were tightened, the watch stopped.
- 11) Rebounding or knocking in one or both dial positions.
- 12) On day/date, the hands aren't synchronized with the changeover.

Since each watch must be rated to within specified tolerances, one should certainly foresee the effects of the faults mentioned will have during the timing test. Any one of them could adversely affect the rate.

Through the years, we've heard charges that in preparation of the watches for the exam, we grind off the pallet stones and/or escape wheel teeth, split the hairspring collet, loosen or break the hairspring at the stud or break the ballet arbor pivot: ***This is never done!*** Watches and clocks are prepared with only the more common problems that are found in customers' watches.

On the occasions where charges of grinding off the pallet stone and/or escape wheel teeth were made, when the watch was returned to AWI and upon examination it was found that the pallet stones were switched. The examinee just failed to recognize their angular difference. Several times, even the monitor who made an issue of it did not recognize what had happened.

Clocks--Certified and Master

- 1) Screws and/or nuts not screwed home or tight. Loose set screws often allow the chime locking plate, self corrector ratio wheels to shift. Hence, the chiming is out of sync (even though it originally tested okay).
- 2) The rack tail fails to fall or land on the snail; sometimes it misses altogether.
- 3) In lieu of making a new fly tension spring, securing the fly to arbor with crazy glue or epoxy.
- 4) The lifting piece occasionally hanging up.
- 5) Oil seeping out of the barrels.
- 6) Burrs on tapered pins and/or not uniform in length.
- 7) Oil smears, or there is an overflow of oil in pivot holes/sinks.
- 8) The self corrector mechanism does not release on the correct quarter.
- 9) Loose or misaligned gathering pallet pin.
- 10) Burrs and/or rough areas on levers or studs--evidence that an attempt was made to adjust by using pliers.
- 11) Bent train wheels; out of true in the flat. (One examinee enclosed a note stating he noticed the bent wheels but did not straighten them because he felt they didn't affect

the running of the clock.)

- 12) Bent or broken train wheel tooth.
- 13) Barrel cap/cover not seated properly.
- 14) Pin on warning wheel soldered or glued in place (end not finished); cutting pliers mark showing.
- 15) Hammers on the rise.

Lathework--Certified and Certified Master Watch

The lathework portion is where the greatest number of failures occur. Here the examinee must work from a specification sheet where specified dimensions and tolerances are given. Dimensions and tolerances are given in order to determine one's ability to deal with precise measurements, skill in handling measuring tools, and whether or not the finished product is an accurate replica of the type of work shown on the specification sheet. All too often, too little attention or respect is given to these stated figures.

One examinee missed the point altogether. He disputed his failure of the pivot portion of his exam because in his opinion the specs given for the replacement pivot were incompatible with the type of clock in which the wheel would normally be installed. This is irrelevant; the purpose of the exercise is to test whether the examinee has the skill to install a new pivot to assigned specification. Let me share with you some of the abnormalities I have found:

- 1) For example, the Certified Master specification sheet may show that the stem's overall length shall be 25.0mm, ± 0.015 mm. This should not be a difficult measurement. However, I have found wide variance with the actual measurement being anywhere from 24.40 to 26.10mm. Other measurements are often found to be equally over or under those given on the specification sheet.
- 2) The pilot is often found tapered or with a flat filed surface. Evidence the file slipped while filing the square.
- 3) The stem clutch wheel square tapered, or the sides filed so uneven that it appears to have been twisted.
- 4) The area where the square abuts the winding pinion shoulder is not squared off evenly; the sides of the square vary in length.
- 5) The detent slot is not squared off; U-shaped.
- 6) The threads aren't cleanly cut due to variance in the diameter of the post, or an oversized die/screwplate was used.
- 7) File marks on the winding pinion shoulder/post. Often, a flat surface or area appears. Again, evidence that the file slipped.
- 8) The diameter of the hub well under/over the specified dimension/tolerance.
- 9) Evidence of rust. Would you believe some work was completely enveloped in rust?

Staff--Certified and Certified Master Watch

- 1) Specified diameters and lengths of various post/shoulders varying as much as 0.18mm over/under given dimensions.
- 2) Shoulders not square--a radius left at the base of the balance hub or roller seat, to such a great extent that it made it impossible to seat the balance wheel or roller properly. Shoulder cuts must be square, sharp, and clean.

- 3) Pivot tapers not polished.
- 4) Shoulder/post grooved or showing circular lines, roughly cut, indicating that the graver was dull.
- 5) The conical and straight portion of the pivot are not in proportion (the accepted proportions noted in most all texts are one-third cone, two-thirds pivot).
- 6) The conical portion does not blend gradually into the straight portion of the pivot. I have seen some where the cone took on the appearance of a square or triangle. I have no idea what type of graver was used here.
- 7) Evidence of rust.

Whether you use blued balance staff wire or drill rod, because of their carbon content, both are very machinable; when cut with a sharp graver, they will produce a smooth, silverish finish. That's why the English refer to it as silver steel. Common sense also dictates that besides the graver being sharp, the T-rest must be properly set, and that in order to do the work correctly, several different shaped gravers are required.

Lathework--Clock Certified

Here the examinee must repivot a clock wheel and replace two wheel teeth. The given dimensions regarding the diameter and length of pivot vary, depending on the size of wheel furnished.

Pivot

- 1) The diameter and length of the pivot varying as 0.48mm to 1.78mm over/under specified dimensions.
- 2) Pivot tapers--often towards the shoulder.
- 3) Shoulder and pivot grooved, lined, or roughly finished, again indicating the use of a dull graver.
- 4) End of pivot not finished. Many are left showing file or cutting pliers marks.
- 5) A groove or space at the point where the plug was fitted into the arbor. When done correctly, the plug and arbor shoulder should appear as one and the same.
- 6) Loose plug; too great of taper on the plug.
- 7) Trace of solder remaining around the base of the plug where an ill attempt was made to secure the undersized plug to the arbor.
- 8) The hole in the arbor drilled off-center.
- 9) The side of the arbor wall being split or cracked. Evidence that too large a plug was forced into the hole. In some instances, an attempt was made to repair the crack with soft solder.
- 10) Blued arbor/pinion, resulting from applying too much heat or improperly when annealing the arbor.

Replacement Teeth

- 1) Width of solder seam too great, usually the result of an improperly fitted plug. When properly done, the seam should be almost undetectable.
- 2) One or both replacement teeth thinner or thicker than the adjacent teeth.
- 3) Tooth on either side of the replacement is damaged due to careless filing.
- 4) Depth or roots of the replacement teeth were greater/less than the regular teeth.
- 5) File marks on the replacement teeth flanks: poorly finished. Just a few strokes with fine emery paper would have been sufficient to improve their appearance.
- 6) The thickness of the replacement plug was over/under the thickness of the rim.

- 7) Excess solder not being removed from the rim or roots between the adjacent and replacement teeth.

Lathework--Certified Master Clockmaker

The lathework of the Certified Master Clockmaker examination permits the examinee two options: The choice to either cut two wheels and one pinion and mount same between a base plate and two bridges, or lay out and construct an operable rack and snail mechanism. In either option, certain measurements are given, and from these measurements it is up to the examinee to lay out and construct a workable model. Listed here are those areas which often result in failure.

Wheels and Pinion Model

- 1) Given measurements over/under by as much as 0.05mm to 1.68mm.
- 2) Wheel teeth and pinion poorly mated. In several instances, some teeth were even filed up to a point to overcome binding.
- 3) Excessive end/sideshake: In some cases, due to poor mating of wheels to pinion, the sideshake was increased to such an extent that the pivot holes were elliptical.
- 4) Wheels out of true in round and flat. Not mounted properly on their respective arbors.
- 5) Tapered pivots and shoulders not square.
- 6) Oil sinks not polished.
- 7) Pivot holes not de-burred.
- 8) Unfinished bridges; saw and file marks and burrs left untouched.
- 9) Pillar tenons not flush with bridges.
- 10) Screwhead slots not centered nor de-burred, nor of equal depth, nor squared off at the bottom. All too many were V-shaped and rough.
- 11) Poor coloring of screws. Specifications require that they be finished to a rich blue color. Colors we see vary from brown, purple, to a pale blue, and are often spotted.
- 12) Unclean (rough) cut screw threads--undersize.
- 13) Screw holes in pillars, over/under in size. In two instances, a thin brass shim was inserted to reduce the hole size.
- 14) Wheels solder to arbor/hub instead of being staked.
- 15) Rusty pinion leaves and screw threads.

Rack and Snail Model

- 1) Rack teeth unevenly spaced and/or poorly finished.
- 2) Gathering pallet pin bent to engage rack teeth.
- 3) Gathering pallet pin being soldered or epoxied to pallet.
- 4) The upper or outer end of the studs/posts unfinished; file/cutting pliers marks. Evidence that they were reduced in height after being riveted to the base plate.
- 5) Improperly laid out snail; rough edges.
- 6) Poorly finished parts; saw/file marks and burrs prevail. All parts must have a smooth or fine grain finish.
- 7) Excessive end/sideshake between studs/posts and lever hubs.
- 8) Uneven wound tension coil spring.
- 9) Studs/post soldered in base plate instead of being riveted.

It is not my intention to highlight these exam faults as an indictment against the training that many in our profession are receiving, whether it be by individual study or in a formal training program. Rather, they are presented to serve as a learning opportunity. *(Continued on page 39)*

Association News

WISCONSIN

The Wisconsin Horological Society held their 58th annual convention in LaCrosse on April 23-25. On Friday Scott Chou from Seiko presented a bench course on the new AGS kinetic quartz watch. He also addressed repairing watches using new technologies. He said, "We must change our way of thinking of repairing watches using new technologies; approach them with a negative attitude and the result will be negative, approach them with a positive attitude and the result will be positive."

Saturday morning Henry Schohl demonstrated the Schohl Crystal Cutting Machine. After a talk about its concept and design, there was a hands-on demonstration. Even those with no watchmaking experience were able to cut a crystal quickly



Scott Chou AGS bench course and talk on new technologies.



Henry Schohl demonstrates his crystal cutting and grinding equipment.

by tracing the bezel with no need to make a blank first. He also showed us his new crystal grinder that finishes off the edges.

Charles Cleves presented a program on repairing and restoring worn gold-filled cases using a mini torch. Again people from the audience with little goldsmithing experience were successful filling in the worn spots. Charles said a little time spent in repairing a vintage case can add a lot to the value of the watch and to its repair. Vintage watches were Charles' next topic in which he covered buying, selling, values, and what collectors look for.

Next was a tour at the LaCrosse Clock Company, a large distributor and retailer of many types of clocks. A talk was given on the Junghans radio-controlled clock.

At the banquet Ray Kujawa of Kilb & Co. was honored for his 62



Charles Cleves presented a hands-on case repair demo and vintage watch talk.

years of outstanding service.

On Sunday, Larry Havorsen, Certified Public Accountant, spoke on money matters relevant to the watchmaker, clockmaker, jeweler, and small business person.

Wes Door was the "Grand Finale" presenting slide programs on making watch crystals and retrofitting quartz movements. Wes showed many tips on these everyday repairs that save time and produce quality results.



LaCrosse Clock Co. tour.

MATERIAL SEARCH NETWORK

EDITOR'S NOTE: This column is designed to work in conjunction with the AWI Movement Bank. If you can supply any of the items listed here, please send details to the Material Search Network. **Do not send the items.** Members requesting these items will be advised of their availability and will contact you direct.

PP14 Rolex, Case #2784, Stainless Steel Crown 5.5mm, BF #883

PP16 Waltham A-11 Aircraft Clock Dial CDIA. (See *Military Timepieces* by M. Whitney, pp. 24 & 26.)

If you can supply any of these items, please contact: **AWI Material Search Network, AWI Central, P.O. Box 11011, Cincinnati, OH 45211.**

UPCOMING ASSOCIATION CONVENTIONS & MEETINGS

October 1-3

New York Watchmakers Association Convention, Holiday Inn, Seneca Falls-Waterloo, NY. AWI Speaker: Fred Burckhardt.

October 8-10

Illinois State Watchmakers Convention, Clock Tower Inn, Rockford, IL. AWI Speakers: Alice Carpenter and Buddy Carpenter.

October 29-31

Florida State Watchmakers Association Convention, Ramada Hotel Resort, West Palm Beach, FL. AWI Speaker: Ewell Hartman.

Book Review

AMERICAN SHELF AND WALL CLOCKS, A PICTORIAL HISTORY FOR COLLECTORS by Robert W.D. Ball. 9"x12", hard covers, 272 pages, 1000+ b/w clock photos, 210 in color. Published 1992 by Schiffer Pub., Ltd., West Chester, PA @ \$69.95.

This is a well illustrated, quality production book in which this reviewer counted about 1200 clocks photographed and of which about 210 are in full color. This is in contention with the statement made on the dust covers that there are "over 2000 clocks" within the covers. Despite this, the numerous clocks pictured, each with representative captions of an average of thirty words, include: maker (where known), circa date, and dimensions and owner or museum credit. Many of the clocks show extra views of the movement.

Mr. Robert Ball has tapped the expertise of New England authorities and their collections. Some include Lindy Larson of Westminster, VT, Dick Bourne of Hyannisport, MA, and Joyce Stoffers and Stuart Mitchel of the American Clock and Watch Museum at Bristol, CT. No mention is made of any other museum or source. Mr. Ball is the author of *Cowboy Collectibles and Western Memorabilia*.

After a one-page author's Introduction which includes a crystallized history of American clockmakers and two pages of cottage clocks, he delves directly into the remaining 264 pages of this photographic catalogue of shelf and wall clocks with their captioned descriptions.

A 16-page listing of American makers includes some watchmakers and in some cases a more detailed history of an important maker. This is followed by a half page of selected bibliography of eight books, which includes some which might be difficult to obtain. Among these might be those by Wallace Nutting (1924) and Hudson Moore (1911).

The over 1000 clocks are fairly representative of the New England and New York makers. The beautiful and some rare wall clocks by the Willards, Howards, Stennes, Ives, Sawin are shown--some in color. The Lemuel Curtis' Girandole, which many consider a most attractive and distinctive early American wall clock, is not found in this book.

The longest section of this book is devoted to shelf clocks. These include the mass-produced Connecticut clocks, early steeple, double steeple, some with wagon springs of the Ives patent by Birge and Fuller; ripple front, ogee and column clocks from many makers can be seen in the long shelf clock chapter. Calendar and mirror clocks, Ansonia swingers, and novelty clocks, kitchen shelf clocks, Kroeber as well as Briggs rotary pendulum clocks and candlestick clocks by Terryville Mfg. Co. and Seth Thomas are attractively shown in color. Blinking eye, mission, acorn and some Welch clocks are included. The double steeple clocks with wagon spring, Ives experimental marine are included, but while a few wagon spring clocks do show their motor power by having the lower doors open, other photos refer to some with Ives' "patent lever" and some with "spring lever," but these features aren't shown or explained.

The subjects of the color photos are wisely chosen, since separate close-ups reveal the skill and artisanship of the cabinet-maker. Many clocks are pitifully titled "maker unknown," or unidentified.

This attractive book lacks an index of the clocks shown; page reference, types of products of makers. This then requires the reader to search through the many pages to visually discover, if at all, the sought item's appearance and description. This could have been combined within the pages of listings of American clockmakers or could have been added in italics together with the page numbers where this maker's clocks are pictured.

The author supplies an ephemeral, loose page of values for each pictured item. Many appear too modestly appraised. Some examples: An Aaron Willard, Jr. decorated banjo, side arms, red and gold upper panel, horse and chariot door panel, \$1000. Another: A double steeple Birge and Fuller, c-1845 wagon spring, 30-hour chain drive, \$850. There is a J.C. Brown acorn clock, fine condition, \$1200. The most expensive item in the book is listed as being an Aaron Willard, Jr. federal gilt gesso and mahogany banjo timepiece inscribed Number 2136, Aaron Willard, Jr., Boston, 8-day wt. brass mvt. with Mt. Vernon door panel, pierced brass side arms, the whole resting on giltwood flared bracket, ending in acorn pendant, height 40 inches, appraised at \$49,000. There is a pillar and scroll by Chauncey Ives of Bristol, CT, c-1825, valued at \$475.

The title of this book may be a bit misleading, since, of the 1200+ clocks, omitting those from New York only about 20 are from outside the New England states. It is more of a book on New England clocks, and a few from New York. There is one Philadelphian, another from Warren, PA, one from Upson Bros., Marion, OH, a Lumas Watson from Cincinnati, OH, and another from Southern Clock Company of St. Louis, MO... these would not seem to qualify this as a representative book of American clockmakers.

It appears that Mr. Ball, not a member of the NAWCC, gathered all his information from museums and collectors within the 150-mile radius of his Connecticut base. No reference is made of other museums or authorities figuratively west of the Connecticut River.

The book, as stated at the beginning of this review, is another quality book from the Schiffer Publishers, with fine photography, color, paper, and binding. Its many clocks make it an attractive picture book of clocks from the northeastern section of the United States.

Henry B. Fried



CERTIFICATION--SUCCESS OR FAILURE (Continued from page 37)

We are all familiar with the old cliché that we learn from our mistakes and the mistakes of others. Thus, by pointing out these various reasons for failure, it is my hope that anyone contemplating taking any one of the examinations will use these observations as a study guide or review sheet, and thus, be in a better position to be a winner instead of a loser. The Committee really is pulling for you to pass the exam.



Shop Talk

Attending a Jewelry Trade Show



Wes Door, CMW

For those who have read this month's "President's Message," you may recognize the fact that the last section of this "Shop Talk" article is somewhat related to that article.

Horologist at a Trade Show

Going to a trade show as a watchmaker or clockmaker can be an interesting experience. We can mix with those who have never seen the inside of a watch or clock, and we probably will look similar enough to blend in with the crowd. Some of us will wear a suit and tie while some will dress more casual, just like the rest of the people who attend. We may sound a little different when we start talking shop about staffs, jewels, batteries, coils, etc., while others around us may be talking about volume of watch and diamond sales, their employees, their alarm systems, etc. Some of us may automatically blend in because we too are both horologist and jeweler.

In the Good Ole Days

Remember when the horologist was an integral part of the jewelry store? The repair bench was in the front of the store, in line with or just behind the front showcase. The watch repair rack was behind or at least close to the repair bench and visible through the front store window. Yes, customers could see the "little ole watchmaker" working away and could also see the large (and full) repair rack. This was the evidence needed to assure them that this was a good repair shop. If their watch was worn out, they could buy a new watch right there. Little kids could watch the craftsman at work and some of them might even contemplate a future career in our field. I'm sure Norman Rockwell must have seen one of these kids when he painted his famous picture of the watchmaker at his bench with a boy looking on. In later years this watchmaking bench was moved to the back room, and some would refer to the horologist as a "necessary evil".

Now the front of the store could be used for making merchandise sales. The space once occupied by a watchmaking bench and repair rack are now a showcase and a wall case. The sign that says "Repair Department" would now hang somewhere toward the back of the store, maybe over a back showcase. The customer would need to walk by all of the nice merchandise to get to the repair department, sort of like grocery stores today which have the bread and eggs in the back area. While the repair department watchmaker was examining a watch or hooking up a chain, the owner or another employee would have a chance to show merchandise and

possibly make a nice sale. The repair department would not get much credit for contributing to this sale as the underpaid repair department was still a necessary evil. So guess what happened. The repair bench which started in the front of the store and increased the store's business moved to the back room, and was then moved out the back door and gone forever or moved to a trade shop.

Help Wanted: 25,000 Watchmakers

Mr. Antoine Simonin, Director of WOSTEP, estimates the need for 25,000 watchmakers in the next 10 years. We at AWI are working with the Watchmakers of Switzerland Training and Education Program (WOSTEP). The following is a quote from Mr. Simonin's January 1993 announcement: "WOSTEP has just launched an ambitious global plan to raise the level of training of watch repairers worldwide. It is vitally important for the watch industry to reach this objective if it is to ensure that the best possible quality of after-sales service is universally available for Swiss-made watches. What is the point of manufacturing in Switzerland a very sophisticated chronograph if, at the end of the chain of distribution, the retailer is unable to explain it? And even if he or she does sell it, he or she cannot provide the proper service for it on the spot?"

I know some of you have seen this above quotation in print before, but I believe it was worth repeating.

We need to be ever mindful of this need for watchmakers, and explain this need to anyone we meet who shows signs of interest; at least talk to the first 25,000. This will take care of our present needs.

Trade Show Sales Talk

At the trade show I mentioned earlier, there was a speaker and subject worth noting. Mr. Robert Kotler, Director of Education at Simon Golub & Sons, presented a talk on "Sales Training for the Retail Jeweler and Sales Staff". The purpose of his speech was to show how to get the maximum performance out of our sales department. He showed how important a customer is by giving good examples from his personal experiences in department store shopping.

As in all our associations with our fellow members and friends, we can learn a lot from others, and we need to keep learning. Also, as long as they can make timepieces faster than we can repair them, we need to continually look for those future watchmakers and clockmakers who will take our place. □

New Products

STAINLESS STEEL BRACELET PIN ASSORTMENT FROM NEWALL

This selection is made up of straight-walled, round stainless steel pins, .80mm to 1.80mm in size. Each size is separated in durable partitioned box, for bracelet repairs as well as other uses. For more information see your watch material distributor, or call for the one nearest you; (800) 621-6296.



NEWALL

L&R'S NEW SUPER-CONCENTRATED JEWELRY CLEANER

L&R Manufacturing Company, an international leader in ultrasonic cleaning systems and solutions for the jewelry industry, has introduced Jewelex, a super-concentrated, individual packet for professional jewelry cleaning.

The non-ammoniated jewelry cleaner is pre-measured to provide the correct amount of cleaner for your ultrasonic tank. Simply open the packet, empty directly into your ultrasonic tank, and add the appropriate amount of water. One packet makes one tankful. It's that easy; no measuring, no mixing, no spilling, no waste. Because of its super concentration and unique packaging, Jewelex helps save on storage of bottles and on freight.

Designed to work in conjunction with your L&R ultrasonic system, the packets are available in two convenient sizes, 1/8-ounce and 1/2-ounce packets. The 1/8-ounce size creates a pint of powerful jewelry cleaner, perfect for a PC3. The 1/2-ounce packet creates 64 ounces of solution, enough for large size ultrasonic tanks.

To receive a free sample of Jewelex, send a request to: Free Jewelex Sample, L&R Manufacturing Co., 577 Elm St., Kearny, NJ 07032-3604. For information, call (201) 991-5330; fax (201) 991-5870.

L&R

BULOVA'S NEW ACCUTRON IN THEIR METROPOLITAN COLLECTION

Contemporary styling is the hallmark of this Accutron watch from Bulova's new "Metropolitan" Collection. Crafted of all stainless steel with goldplated accents, the cylinder endpieces link case to bracelet in keeping with the overall design. Applied markers and hands accent the gilt dial with date window. The bezel highlights etched Roman numerals and the applied Accutron logo.

Additional features include a unique hidden clasp and hidden crown, a sapphire crystal, water resistance to 3 ATM, and the unprecedented Accutron 25-year limited warranty.

The model illustrated below is #28B14, and retails at \$595. For more information, contact: Bulova Corporation, One Bulova Ave., Woodside, NY 11377; (718) 204-3300.



BULOVA

RUBIN & SON'S HIGH-PERFORMANCE GOLD TESTER

Rubin & Son has introduced a new, low-cost gold tester from Tri Electronics that quickly and effectively determines gold karat values from 6 Kt. to 24 Kt.

The GT-4000 gold tester uses the patented and proven method that employs an easily replaceable and ecologically safe gel testing-electrolyte in a simple dispensing cartridge. There are no messy, dangerous, or corrosive liquids required in the process.

Gold karatage is measured by obtaining a numerical reading from the LCD display and conveniently matching it with values in a look-up table in the instruction manual.

GT-4000 runs on two 9V batteries which provide an average operating life of 50+ hours.

The GT-4000 is made in the USA, and comes with a two-year manufacturer's warranty. Its suggested list price is \$395.95, and is being offered at the special introductory price of \$349.95.

For further information, contact: Rubin & Son, (800) 223-5566.



RUBIN & SON

LONGINES-WITNAUER INKS LONGLIFE PACT

On the heels of a spectacular introduction of the Wittnauer TTC Longlife watch, the remarkable timepiece with the exclusive 20-year battery, Longines-Wittnauer has signed an exclusive agreement with Technology Transfer Corporation of Stadthagen, Germany. TTC is the developer of the 20-year watch battery which has revolutionized power cell technology.

Longines-Wittnauer, the New Rochelle, NY-based watch company, will be the exclusive agent for TTC Longlife Watches in the United States. Says Renny Swift, President of Longines-Wittnauer, "This is a perfect fit. Wittnauer is a leader in styling, quality, and technology. And TTC fills the bill on all three counts."

"Moreover," adds Swift, "Longlife is a boon to the environment. The lithium-iodine battery has no heavy metals, no polluting mercury."

Asked about the future, Swift promises new styles, including ladies' models, sport watches, and more. He will also continue intensive advertising support to maintain the momentum for this state-of-the-art watch collection.

LONGINES



News in the Trade

MAXELL BATTERY DIVISION APPOINTS NEW WESTERN REGIONAL SALES MANAGER

The Maxell Corporation of America has announced the appointment of John Allen as Western Regional Sales Manager for the Battery Division. In his new position, Allen will coordinate OEM and retail sales activities in 13 western states from Maxell's office in Cerritos, CA.

"My first goal," says Allen, "is to continue Maxell's expanding penetration into the retail market. We have the most complete line of batteries in the market and we've priced them advantageously to give retailers an excellent profit potential."

Prior to joining Maxell, Allen was active in the Manufacturer's Representative business where he had extensive sales experience with consumer electronics and home and office equipment. Allen resides in Newport Beach, CA.

BULOVA PRESENTS REEVES WITH A TIMELY WELCOME

Preston Robert Tisch, co-owner of the New York Giants and co-CEO of Loews Corporation, the parent company of Bulova Corporation, joined with Cyril C. Gsell, Vice President of Bulova Sporttime and Paul S. Sayegh, CEO of Bulova Corporation, in wishing Dan Reeves every success as new head coach of the New York Giants organization.

Reeves was presented with an Accutron watch featuring the Giants' logo on its dial. "We hope this specially designed Accutron watch will symbolize new times ahead for you," Gsell stated. "Bulova is proud to present this one-of-a-kind timepiece to you," commented Sayegh, "and we hope it will signify a winning season for the Giants and for you as their coach."



From left to right: Preston Robert Tisch, Cyril C. Gsell, Dan Reeves, and Paul S. Sayegh.

FORMER YANKEE STAR KEYNOTE SPEAKER AT L&R SALES MEETING

Jim Bouton, former pitcher for the New York Yankees, author, entrepreneur, and motivational speaker, was the keynote speaker at a recent national sales meeting for L&R Manufacturing.

Bouton, who played for the Yankees in the 1960s, addressed the more than 30 salespeople from across the country in a lively speech that was a self-disclosing mix of Yankee stories during the "Glory Days" and his own entrepreneurial venture with Big League Chew and later personalized Big League Cards.

Playing for a successful team inspired Bouton's business credo. "You've got to have the right people on your team. They've got to be team players; not necessarily superstars, but team players," said Bouton. "You can't be standing around waiting for someone else to do the job for you. You've got to look for the opportunity and grab for it. And if you don't get it the first time around, you try it again."

L&R President James J. Lazarus, "I've always been a friend and fan of Jim's for many years, and I thought it would be not only a treat to our salespeople to have him address them, but I thought it would be inspirational as well. So much of business is about teamwork." L&R Manufacturing Company is a world-wide leader in ultrasonic technology, manufacturing a full line of ultrasonic cleaning systems and solutions for the industrial marketplace.



James J. Lazarus and Jim Bouton.

TIME PRODUCTS SETS SIGHTS ON LUXURY MARKET

With a dynamic Open House in its newly designed showroom, Time Products left no doubt that they intend to be a major force in the luxury goods industry. The Manhattan event marked the coming together under one roof of three exclusive products, Audemars Piguet, Blancpain, and Judith Leiber.

Present at the event was Marcus Margulies, who, as CEO of Time Products has built the company through a series of timely acquisitions. He served as host to a group of select jewelry retailers from around the country.

"We believe that Time Products will be one of the driving forces in the luxury goods market for many years to come," said Larry Geisler, Managing Director of Audemars Piguet in the U.S. "Everything that we do will have to live up to the quality of the products that we sell. The organization, from top to bottom, will be dedicated to a very high standard of excellence."



Playing hosts to a select group of jewelry retailers were from left to right: Larry Geisler, Managing Director of Audemars Piguet; Marcus Margulies, CEO of Time Products PLC, and Steve Urquhart, Director of Audemars Piguet. The Manhattan event marked the coming together under one roof of three exclusive products, Audemars Piguet, Blancpain, and Judith Leiber.

ANTIQUARIAN HOROLOGICAL SOCIETY WELCOMES NEW PRESIDENT

The Astronomer Royal, Professor Arnold Wolendale FRS, was given an enthusiastic welcome as the new President of the Antiquarian Horological Society at their annual general meeting.

In his address to the members, Professor Wolendale touched on the problems of time still to be resolved, and the role of missing mass connected with the big bang theory, and suggested that there might be stronger links between the Antiquarian Horological Society and other Societies concerned with time and the Universe.

The Antiquarian Horological Society, with its international membership, celebrates its 40th Anniversary this year. New members are always welcome, and those interested should contact Maria Collins, New House, High Street, Ticehurst, E Sussex, England.

18KT GOLD SCREWS FROM GUENTHER & SONS

Guenther & Sons has now made available 18K yellow gold case back screws. These are perfect for any high-grade watch requiring case screws. Available in 0.70mm, 0.80mm, 0.90mm, and 1.0mm threading sizes.

For more information, call Guenther & Sons at (213) 892-8033; fax (213) 892-8035; orders (800) 462-1962.

Silent Auction



This is your opportunity to own this rare 14K gold medallion honoring horology. Hundreds of these American Horologist medals have been sold in silver. **ONLY SIX HAVE BEEN MADE AVAILABLE TO THE PUBLIC IN 1 OZ. 14K GOLD.**

Renata U.S./Kessler Sales, Inc. has made these medals available to the AWI ELM Charitable Trust for auction. The proceeds are to benefit the Trust's Student Aid Fund. One medallion has already been auctioned. Those remaining will be auctioned on a bi-monthly basis. The final date for bids on this medallion is **November 10, 1993**. Only bids in excess of \$550 will be considered.

You may use the form below or a facsimile to make your bid.

To: **The AWI ELM Charitable Trust**

I wish to bid \$_____ for the 1 oz. 14K gold American Horologist Medal. I understand that the bidding for this medal closes October 10, 1993. I also understand that if payment is not made within ten days after notification of a successful bid, the Trustees will consider my bid withdrawn. Send bids to: **American Horologist Medal, AWI ELM Charitable Trust, 3700 Harrison Avenue, Cincinnati, Ohio 45211.** *The Trustees reserve the right to cancel this offer if they so choose.*

If the successful bidder,

I will pay for the medallion by:

- () credit card (Visa/MasterCard)
 () personal check
 () other _____

Name _____
 Address _____
 City _____
 State _____ Zip _____

PROJECT EXTEND CLASS RE-ALIGNMENT

Watch I (formerly #VI)
Watch II (formerly #I)
Watch III (formerly #II)
Watch IV (formerly #III)
Watch V (same)
Watch VI (formerly #IV)
Watch VII (new)
Watch VIII (formerly #VII)

American Pocket Watches
 Staffing & Lever Escapement
 Hairspring Vibrating & Timing Adjustments
 Calendar, Automatic, Stop Watch & Chronos
 Watch Restoration
 Introduction to Complicated Watches
 Clock-watches & Perpetual Calendars
 CMW Review & Exam

A. Carpenter
 J. Lubic
 J. Lubic
 J. Lubic
 R. DeCorte
 A. Simonin
 P. DuFour
 J. Lubic

Quartz I (same)
Quartz II (same)
Quartz III (same)

Meter Reading, etc.
 Advanced Quartz
 CMEW Review & Exam

G. Jaeger
 B. Bishop
 A. Carpenter

Clock I (same)
Clock II (formerly #VI)
Clock III (new)
Clock IV (formerly #II)
Clock V (formerly #III)
Clock VI (formerly #IV)
Clock VII (formerly #V)

Beginning Clock Repair
 Chiming & Striking Mechanism
 Clock Escapements
 Advanced Clocks
 Clock Restoration
 Clock Repairing Operations
 CMC Prep

J. LaChapelle
 J. Nagle
 J. Nagle
 R. Iverson
 D. Christianson
 J. Nagle
 D. Christianson

Beginning Horology (new)

J. Lubic

The Lathe Course (12 days, 1 complete course)

R. Hovey

Clock Case Repair (same)

J. Williams

Watch Case Repair (same)

M. Richmond

Basic Jewelry Repair (same)

M. Richmond

CLASSIFIED ADS

REGULATIONS AND RATES

Ads are payable in advance \$.70 per word, \$.80 per word in **bold type**. Classified display ads are \$30.00 per column inch, 2-1/4" wide. Ads are not commissionable or discountable. The publisher reserves the right to edit all copy. Price lists of services will not be accepted. Confidential ads are \$4.00 additional for postage and handling. The first of the month is issue date. Copy must be received 30 days in advance (e.g. December issue closes for copy on November 1st).

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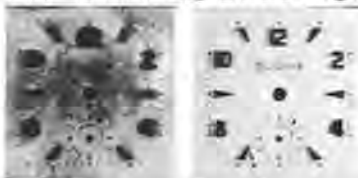
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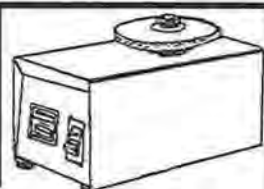
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Dates to Remember

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OCTOBER 1993

1-3--New York Watchmakers Association Convention, Holiday Inn, Seneca Falls-Waterloo, NY.

8-10--Illinois State Watchmakers Convention; Clock Tower Inn; Rockford, IL. For more information contact: Jack Donovan, 124 North St., Normal, IL 61761.

10--Watchmakers Association of Ohio Auction, 12 Noon, American Legion Hall, Southway Post 144, 3253 South High St., Columbus, OH. For more information contact Karl Farnlacher (513) 275-3172.

16-17--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Denver, CO.*

22-25--Cross Slide/Arbors & Stems Bench Course (AWI); Roy Hovey, instructor; New York, NY.*

24--Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Austin, TX.*

25-29--Minute Repeaters--Clock (Sonnerie) Watches and the Instantaneous Perpetual Calendar, Philippe DuFour, instructor, Project Extend Education Center, Cincinnati, OH.*

29-31--Florida State Watchmakers Association Convention, Ramada Hotel Resort, West Palm Beach, FL.

30-31--Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Arlington, TX.*

30-31--Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Minneapolis/St. Paul, MN.*

NOVEMBER 1993

6-7--Striking Clocks Bench Course (AWI); John Nagle, instructor; Salt Lake City, UT.*

13-14--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Austin, TX.*

JANUARY 1994

15-16--Hairspring Vibrating Bench Course (AWI); Joseph Cerullo, instructor; Baltimore, MD.*

21-23--AWI Board of Directors Mid-Year Meeting & Regional, Anaheim, CA.

FEBRUARY 1994

11-14--Lathe Bench Course, Phase 3 (AWI); Roy Hovey, instructor; Orange County, CA.*

19--Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Phoenix, AZ.*

19-21--Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Phoenix, AZ.* Held in conjunction with the Arizona Clockmakers & Watchmakers Guild Annual Convention.

19-21--Advanced Clock Repair Bench Course (AWI); Roland Iverson, instructor; Phoenix, AZ.* Held in conjunction with the Arizona Clockmakers & Watchmakers Guild Annual Convention.

MARCH 1994

12-13--Repair of the Atmos Clock Bench Course (AWI); Gerald Jaeger, instructor; Orlando, FL.*

12-13--400-Day Clock Repair Bench Course (AWI); John Nagle, instructor; Salt Lake City, UT.*

19-20--Advanced Quartz Watch Repair Bench Course (AWI); Robert Bishop, instructor; Birmingham, AL.*

20--Introduction to Quartz Watch Repair Bench Course (AWI); Buddy Carpenter, instructor; New York.*

20--Basic Pocket Watch Bench Course (AWI); Alice Carpenter, instructor; Sacramento, CA.*

APRIL 1994

8-10--Mechanical Watch Repair Bench Course (AWI); James Lubic, instructor; Sacramento, CA.*

9-10--Cuckoo Clock Repair Bench Course (AWI); James Williams, instructor; Baltimore, MD.*

9-10--Modern Mechanical Chronograph Bench Course (AWI); Remy Waelchli, instructor; Orlando, FL.*

22-25--Lathe Bench Course, Phase 3 (AWI); Roy Hovey, instructor; New York, NY.*

MAY 1994

15--Servicing ETA Quartz Chronographs Bench Course (AWI); James Broughton, instructor; Birmingham, AL.*

21-22--Advanced Quartz Watch Repair Bench Course (AWI); Robert Bishop, instructor; New York.*

21-22--Introduction to Clock Repair Bench Course (AWI); Buddy Carpenter, instructor; Boston, MA.*

*For more information on AWI Bench Courses, Project Extend, and Regional Seminars, contact AWI Central, P.O. Box 11011, 3700 Harrison Avenue, Cincinnati, OH 45211; (513) 661-3838; Fax (513) 661-3131.

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To register for these courses, please send with your request a registration fee of \$35 per instruction day (for AWI members) to:
AWI Central, 3700 Harrison Ave., P.O. Box 11011, Cincinnati, OH 45211.

PLEASE NOTE: Registrations are limited and will be selected by the **EARLIEST POSTMARKS**. You may register by fax if you wish; if so, please include your Visa or MasterCard number, card expiration date, and signature.

FAX: (513) 661-3131 -- INFORMATION: (513) 661-3838

SEPTEMBER 1993

17-19--Advanced Clock Repair--Des Moines, IA
 17-20--Cross Slide Lathe Course--Orange County, CA
 18-19--Repair of the Atmos Clock--New Orleans, LA
 18-19--Hairspring Vibrating--Pittsburgh, PA
 18-19--Cuckoo Clock Repair--Indianapolis, IN*
 19-20--400-Day Clock Repair--Tucson, AZ*
 19-20--Mechanical Chronographs--Tucson, AZ*

OCTOBER 1993

16-17--Hairspring Vibrating--Denver, CO
 22-25--Cross Slide/Arbors & Stems--New York, NY
 24--Servicing ETA Quartz Chronographs--Austin, TX
 29--Basic Pocket Watch--W. Palm Beach, FL
 30-31--Repair of the Atmos Clock--Arlington, TX
 30-31--Cuckoo Clock Repair--Minneapolis/St. Paul, MN

NOVEMBER 1993

6-7--Striking Clocks--Salt Lake City, UT
 13-14--Hairspring Vibrating--Austin, TX

JANUARY 1994

15-16--Hairspring Vibrating--Baltimore, MD
 21-23--Mid-Year Meeting & Regional--Anaheim, CA

FEBRUARY 1994

11-14--Lathe Course (Phase 3)--Orange County, CA
 19--Servicing ETA Quartz Chronographs--Phoenix, AZ*
 19-21--Advanced Clock Repair--Phoenix, AZ*

MARCH 1994

12-13--Repair of the Atmos Clock--Orlando, FL
 12-13--400-Day Clock Repair--Salt Lake City, UT
 19-20--Advanced Quartz Watch Repair--Birmingham, AL
 20--Introduction to Quartz Watch Repair--NY
 20--Basic Pocket Watch--Sacramento, CA

COURSES & INSTRUCTORS

Advanced Quartz Watch Repair

Robert Bishop, CMEW

Basic Pocket Watch

Alice Carpenter, CMW, CMEW

Introduction to Clock Repair

Introduction to Quartz Watch Repair

Buddy Carpenter, CMC, CMEW

Advanced Clock Repair

Roland Iverson, CMC

Repair of the Atmos Clock

Gerald Jaeger, CMW, CMEW, FAWI

Mechanical Chronographs

Mechanical Watch Repair

James Lubic

Cuckoo Clock Repair

James Williams, CC

400-Day Clock Repair

Striking Clocks

John Nagle

Servicing ETA Quartz Chronographs

James Broughton, CMEW, FAWI

The Lathe Course

Roy Hovey

Hairspring Vibrating

Joseph Cerullo, CMW, CMC

Modern Mechanical Chronographs

Remy Waelchli

APRIL 1994

8-10--Mechanical Watch Repair--Sacramento, CA
 9-10--Cuckoo Clock Repair--Baltimore, MD
 9-10--Modern Mechanical Chronographs--Orlando, FL
 22-25--Lathe Course (Phase 3)--New York, NY

MAY 1994

15--Servicing ETA Quartz Chronographs--Birmingham, AL
 21-22--Advanced Quartz Watch Repair--NY
 21-22--Introduction to Clock Repair--Boston, MA

JUNE 1994

4-5--Hairspring Vibrating--Des Moines, IA
 5--Servicing ETA Quartz Chronographs--Orlando, FL

*In conjunction with a convention

PROJECT EXTEND CLASSES 1993-94

Contact AWI Central for the *General Information Brochure* for Project Extend and specific course brochures for classes that interest you.

SEPTEMBER 1993

13-17--Watch Case Repair--M. Richmond
 20-24--Clock I--J. LaChapelle
 27-Oct.1--Clock II--J. Nagle

OCTOBER 1993

4-8--Clock IV--R. Iverson
 11-15--Clock Case Repair--J. Williams
 18-22--Clock VII--D. Christianson

FEBRUARY 1994

7-11--Quartz I--G. Jaeger
 14-18--Quartz II--R. Bishop
 21-25--Quartz III--A. Carpenter
 Feb. 28-Mar. 4--Watch I--A. Carpenter

MARCH 1994

7-12--Clock Case Repair--J. Williams
 14-26--Lathe Courses--R. Hovey

Please see page 43 for Project Extend's class re-alignment.

APRIL 1994

18-22--Watch II--J. Lubic
 25-29--Watch III--J. Lubic

MAY 1994

2-6--Clock I--J. LaChapelle
 9-13--Clock II--J. Nagle
 16-20--Clock III--J. Nagle
 23-27--Clock IV--R. Iverson

JUNE 1994

6-10--Clock V--D. Christianson
 13-17--Watch V--R. DeCorte