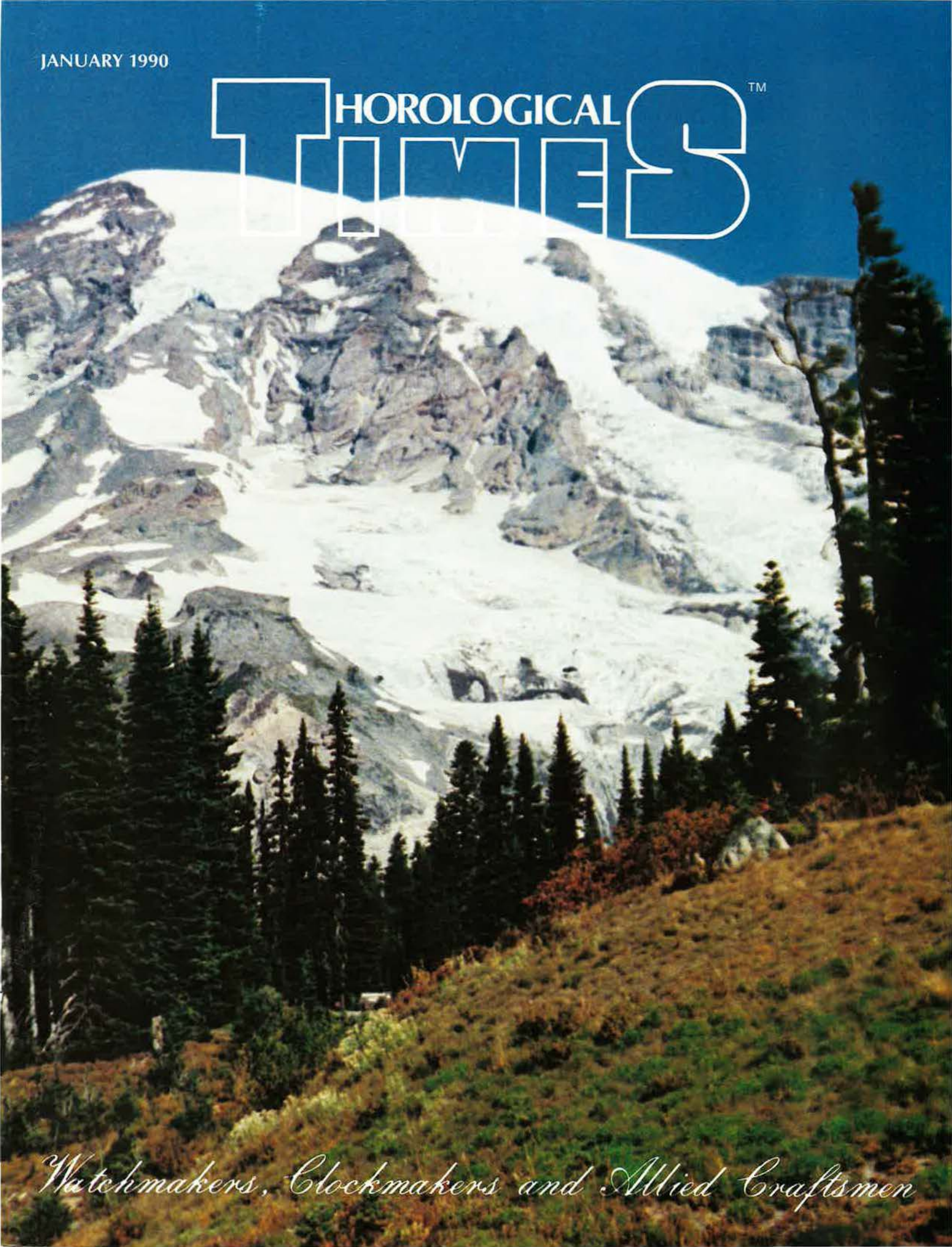
JANUARY 1990

HOROLOGICAL TIMES™



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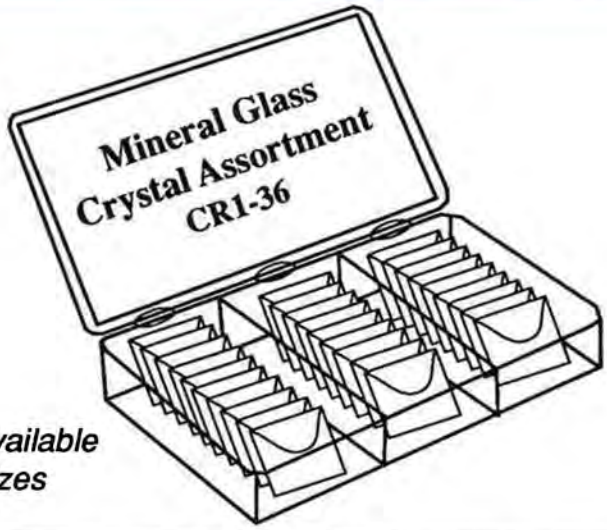

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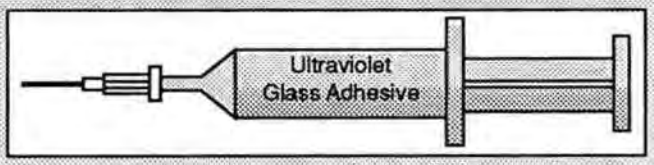

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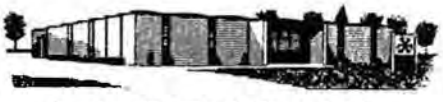

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VOLUME 14, NUMBER 1 JANUARY 1990

HOROLOGICAL TIMES™

Official Publication of the American Watchmakers Institute

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President's Message

Two months ago I discussed the upcoming 30th anniversary celebration. Now a program has been confirmed which we believe will entice many of you to leave your bench to join us for a few days of celebration and knowledge.

Antoine Simonin, Director of WOSTEP, that fine Swiss training program that has provided the final polish to many of our finest craftsmen, will present a five-day bench course on servicing complicated watches. Mechanical watches are not dead; new models are being manufactured, and will be part of our repair income indefinitely. This will be a rare opportunity to learn from the best. The dates of the seminar are June 16-20, and enrollment is limited. Tuition is $125.00.

On June 22nd and 23rd we will feature a display and demonstration of horological items created by some of the best craftsmen in the world. Robert Gruen will show and discuss some of the rare early Gruen watches made by his family.

The speakers program on Saturday we believe will be a winner. George Daniels, probably the world's foremost watch*maker*, will journey from his home on the Isle of Man, England, to speak to us on how some of his original timepieces are created. Those of you who attended our 25th anniversary celebration know that his presentation is well worth attending.

For our clockmaking friends, we have invited Dana Blackwell, Curator of the American Watch and Clock Museum, in Bristol, CT, to speak. His expertise in this field is well known, and we are looking forward to his program.

Nobody knows the pieces in our AWI Collection better than Henry Fried. His lecture will feature the history and technology of some of our best watches, using a video camera and monitors, so that everyone can see. Following his lecture, he will be in the display room where you can talk to him and see the collection firsthand.

No celebration would be complete without a banquet. Ours will feature a top speaker of interest to everyone, good food, and fellowship. A luncheon cruise for the ladies is planned for Saturday.

Oh, yes—it will be held at the Radisson Hotel at the Airport, just across the river from Cincinnati, OH. Of course, you are welcome and encouraged to attend and take part in the Affiliate Chapter meeting on Friday, and the Board of Directors meeting on Sunday.

I hope the forgoing has whetted your appetite. The costs will be low because of our Perpetuation Fund, and the rewards great. Think 30th!

Robert F Bishop

ON THE FRONT: The highest mountain in the contiguous U.S., Mount Rainier (elevation 14,410 ft.). This scene is from our President, Robert F. Bishop, Glenshaw, PA.

Up Front

This past year has been an eventful one for AWI. Members can avail themselves to a number of services which have recently been expanded or implemented. We will review some of them here so that you will be aware of the advantages you have as an AWI member. We invite every member to use these services at every opportunity during 1990.

WORSHOPS & REGIONAL MEETINGS

After a moratorium of nearly two years, AWI is once again bringing workshops into most areas of the country. A check of the mailing envelope for this January edition of *Horological Times* will reveal the projected schedule of courses. Additional courses are being arranged and their schedule will be announced in the near future. Since most AWI courses involve small group instruction, registration is limited. If you are interested in a course, drop AWI a note now so you will receive a registration form as soon as the course has been finalized. Registrations are accepted strictly by the earliest postmark of the application.

The advance schedule of workshops also lists the location of the Regional Meetings which have been pleasing AWI members for the past year. Regional meetings are free to all members. A well-rounded technical program is presented and members are guests of the Institute for noon luncheon. Plan to attend the Regional that is scheduled nearest you; you will be glad you did.

MATERIAL SEARCH NETWORK & MOVEMENT BANK

During this past year the Material Search Network and Movement Bank moved from the planning stage to reality. Members who are searching for a difficult-to-find piece of material can use the service for a fee of $5, or the donation of two useable vintage movements to the Movement Bank. The "Up Front" column on page 4 of the September 1989 *Horological Times* gives complete details.

The items being searched for are first faxed to material distributors on the network. If a positive answer is not received, a search is made of the Movement Bank for a useable used part. If the Movement Bank does not have the item sought, it is listed in the Material Search Network column of *Horological Times*. We have been 80% effective in answering our members' difficult material needs through the "Network."

"SECOND OPINION" PROGRAM

The "Second Opinion" program, designed to assist members in solving their difficult repair problems, is now ready to move from the planning stage to implementation. Members can select a qualified consultant from a list provided by AWI. They will discuss their problem with the consultant and, if necessary, send their "problem" to the consultant for examination and recommendations as to how the problem might be solved. There will be a fee for this service to cover the consultant's time.

TECHNICAL CONCLAVES

A new concept in assisting local associations to bring meaningful programs to their members is also off the "drawing board" and will become a reality May 3-6, 1990. On these dates five mid-Atlantic states and the AWI will team up to present an outstanding educational opportunity for the members in this region. See page 49 of this issue for details.

AWI'S 30TH ANNIVERSARY

On June 23, 1990 AWI will acknowledge its 30th Anniversary. A special speakers program has been arranged and a collection of handmade horological items will be displayed. A number of pieces from the world-famous AWI Packard Collection of watches will be on display and demonstrations of various phases of the art of watchmaking are scheduled. See page 51 of this issue for more complete details.

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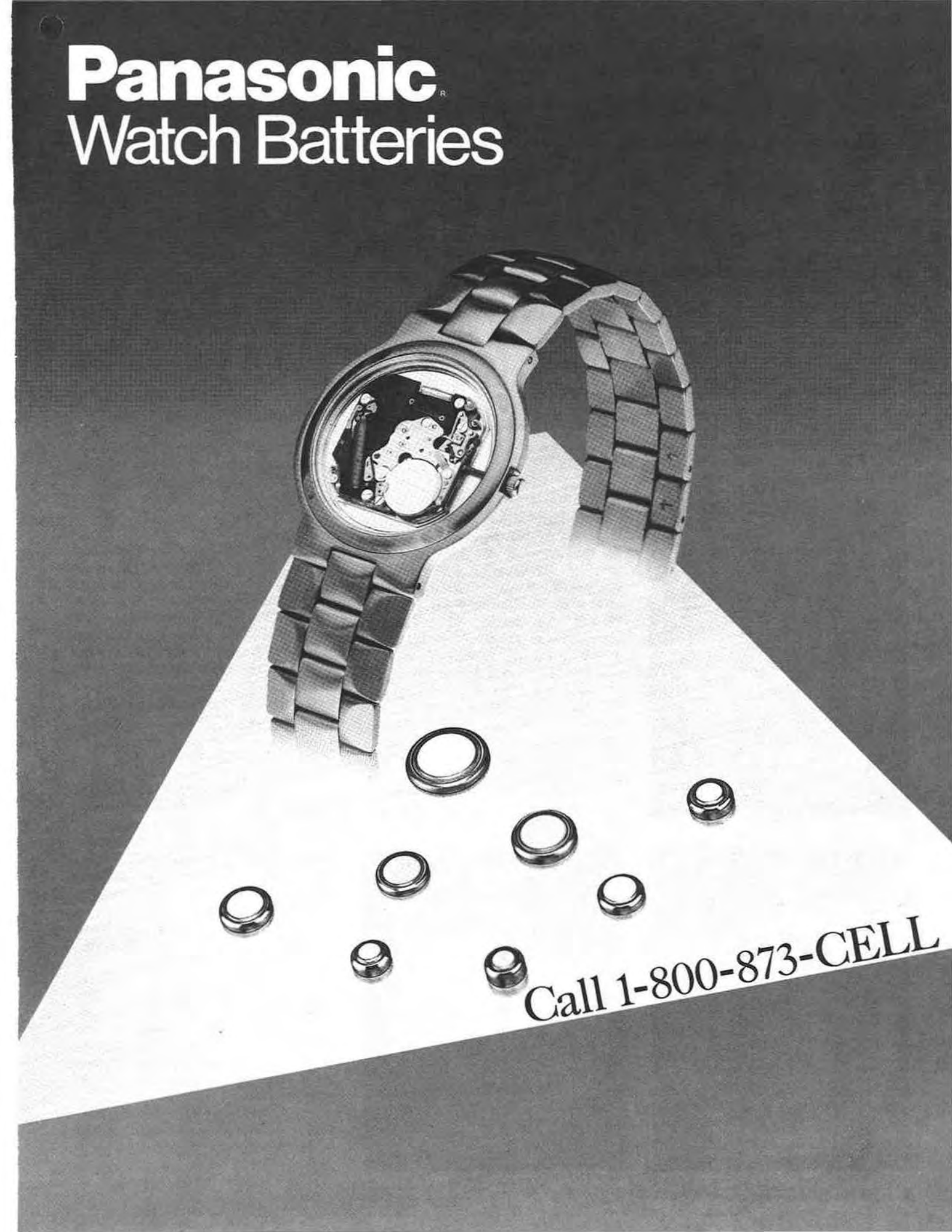


Call 1-800-873-CELL

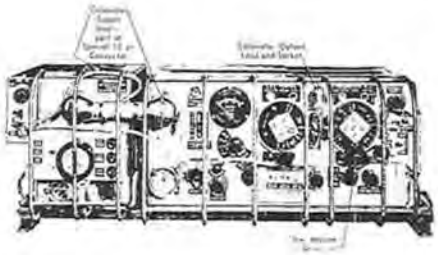
Questions & Answers

Henry B. Fried, CMW, CMC, FAWI, FBHI, ★FNAWCC

A CANADIAN MILITARY WATCH

Q I am enclosing three photos and other data on a quite uncommon watch. It is the official military watch from a No. 19 wireless set as used in WWII. I would be glad if you could supply any additional information such as the manufacturer, how many were made, etc.

The watch fits into its holder on the front of the radio as shown in the reproduced page 12 from the manual. As it is so mounted, there are no holes for a bow in the pendant.



Some other clues are: "Swiss made" on the dial, the works, and stamped on the inside of the back cover; no provision for loop on the stem; used in a bakelite holder on the front of the wireless set No. 19 from WWII; 15 jewels; "G.X.M." on works; ⇧ Canadian army symbol; scratched on the inside of the back cover "KW89290, 38642W and N202446"; the description in the No. 19 manual: "Watches, Non-Magnetic, W.T. Cat. No. ZA7400"; and the description in the No. 52 manual: "Watches, Non-Magnetic, W.T. V.A.O.S. No. VC7563 Mfg. or part diag. No. CMC 108-012" (Canadian Marconi Company).

John Plewes
Carp, Ontario, Canada

A *I have positively identified your movement, at least as a calibre 41700 Unitas, 18½ ligne, made either in 15 or 16 jewels.*

Unitas is still in business in Switzerland, mainly in producing pocket-sized timepieces for style use or other industrial purposes. Their address is: Unitas S.A., Tramelin, Switzerland.

You might try writing to them for the technical details of your particular watch obviously made for the Canadian government. We here in the USA would have no knowledge of this.

Q I have a watch in for repair. The customer would like some information as to the make, age, etc. The watch in the "Questions & Answers" column in the February 1989 issue of *Horological Times* (page 8) looks a lot like his watch except it is not a repeater. It has a brass outer case hinged both back and bezel. On the back of the case is Case No. 3752 and

COLORADO

The inter case is silver hinged bezel case No. 1900, a No. 3 on pendent, and FIT or F11 in the case back.

It is key wind, fusee driven, Roman figures, front wind, ratchet under dial, no jewels, and no name on the plates. On the regulator plate is "Advanced Retard."

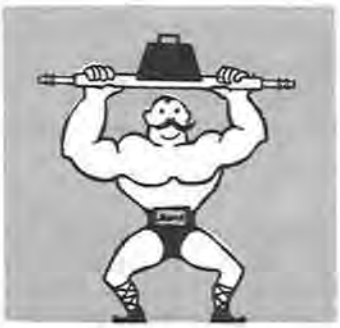
Jewel J. Bonat
Hamilton, KS

A *Your watch is of the 1800 period, probably Swiss-French. The watch industries in both countries were within visiting distance of each other and is difficult to tell them apart, especially since so few of these were signed.*

Yours seems to be of very modest quality. Colorado would appear to be an American name derived from

(Please turn to page 8)

Borel World's Strongest SPRING BAR



The BOREL 100% Stainless Steel Spring Bar is the world's strongest spring bar. It guarantees peace of mind three ways:

- The body and tips are far stronger than others. Very important on the new thin styles.
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The Borel Spring Bar System No. 267 features 40 dozen Borel Stainless Steel Spring Bars in four types: Double Shoulder, Double Flange, Thin and Special (for buckles in metal bands). They're put up in a professional cabinet with 24 jumbo size bottles. An intregrated chart gives full description of contents, plus bottle position.

You'll find a Spring Bar in this assortment for nearly every need. Greater quantity is supplied of most popular sizes: 5/8", 11/16", 3/4".

Spring Bar Asst. 267/40 $55

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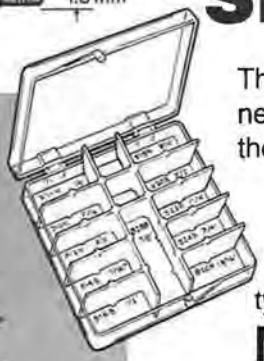
1/4
5/16
3/8
7/16
1/2
9/16
5/8
11/16
3/4
13/16
7/8

DOUBLE FLANGE
5/8
11/16
3/4
13/16
7/8

THIN 1.5mm
1/2
9/16
5/8
11/16
3/4
13/16
7/8

SPECIAL BUCKLE No. 20
5/8

New Ultra-Thin Stainless Steel SPRING BAR



These spring bars are used in many new watches where band fits close to the case. This assortment contains 66 bars, 6 each of 11 sizes, in a small partitioned plastic box.

Replaces many of the Seiko type spring bars. Refills available.

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Otto Frei – Jules Borel, National Order Desk – 1-800-772-3456
P.O. Box 796, Oakland, CA 94604

Borel

QUESTIONS & ANSWERS
(Continued from page 6)

the Spanish who first named those parts of the USA. The case could be American since there was a good watch case industry before America produced watches.

At that time the import duties on fully cased watches into this country did help the new settlers from abroad who also were casemakers.

Q I have never had an occasion to need help in identifying a watch movement, but I finally got caught! I hope the photocopies are clear enough to help in the identification. The only printing on the movement is "Switzerland" and the numbers 98277. It is a 19 ligne movement, 21 jewel, lever set, in a yellow gold-filled hunting case. The case appears to be U.S.A. Essex, C.W. Mfg. Co.

It is such a beautiful watch and there is no manufacturer's I.D. All the jewels are ruby or sapphire set in gold jewel settings. The escape wheel, pallet, and balance jewels are capped. The balance is bi-metallic with gold screws and four meantime screws. There is a very nice breguet hairspring but the steel is a bit unusual, somewhat a half cylinder with tap extending on top of the balance bridge anchored with a screw in the center. The roller extends only on the side of the roller jewel. The pallet is very nice with balanced horns on each side, beautifully finished jewels and steel work. All plates are nickel and engine turned on each side. The watch has a double-sunk snap on the dial.

I appreciate any assistance you can offer.

D.A. Johnson
Madison, WI

A *I have examined the photocopy of your movement and have searched through my many catalogs of watch movements and fail to come up with a positive identification. The Essex Watch Mfg. Co. was the product of the Courvoisier-Wilcox Mfg. Co. of New York early in this century.*

The movement's decoration is almost like what was used about that time by the Unitas Watch Company of Switzerland. This might have been a special calibre and ebauche of much higher quality than most of their products. The regulator and snail were used mainly by Agassiz of Geneva. The snap-on dials were used mainly be Geneva quality movements and might well be of the Agassiz benches.

Henry B. Fried

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Bench Tips

Joe Crooks

THE "CLOCKOSCOPE"

This month's bench tip is from James Peghiny of Auburndale, MA.

Sometimes it is very difficult to hear the ticking of a clock in a noisy area. This can be especially irritating when one is trying to put a clock in beat.

You can, of course, buy a modern, battery-operated amplifier/speaker box with a clip-on microphone. Several low-cost versions are available. There is another earlier device used by old-timers which can be made using scrap parts available in any clock and watch shop which doesn't use batteries. It might be worth a bench tip, especially for the younger group.

The device can easily be made using one of the many empty 2" unpainted material cans lying around the shop, plus a 12" piece of 1/8" cold rolled steel, brass, or welding rod. The rod is simply soldered to the bottom of the can where it has been slightly filed flat on one side.

A sketch of the completed unit is shown in Figure 1. The wire can be almost any practical length, one foot being about right. The device functions similar to that of a doctor's stethoscope in that sound vibrations are conducted up the rod and amplified to the ear by the can.

To use the device, simply press the can to your ear and touch the clock with the rounded tip of the rod. This "clockoscope" amplifies enough that you can even hear the clock in the noisiest places, and just think–no worry with run-down batteries.

Jim, what irritates me MOST while I'm trying to put a clock in beat–while the little kids are whooping through the house playing cowboys and Indians, and the teenage son is blasting out on his new high-watt amplifier, and the mother has the TV (in the room with the clock) turned up high enough to hear her soap opera above the son's boom box and the washing machine and dishwasher and the teenage daughter sitting at the phone (next to the clock) yelling to her girlfriend above all this noise, plus the dog barking his head off at the stupid nut holding down the doorbell–I repeat: what irritates me MOST is the father screeching dumb questions about the clock in my other ear faster than a crow can caw at an owl trying to land in the tree where his nest is. **That's what irritates me!!**

Solution: Go to your favorite auto parts house and spend 6 bucks for an auto mechanic's stethoscope which plugs into both ears and cuts out all outside noise (see Figure 2).

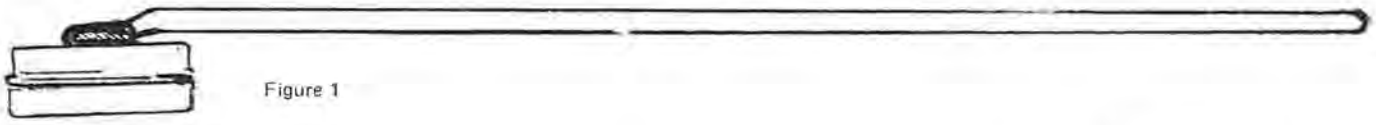
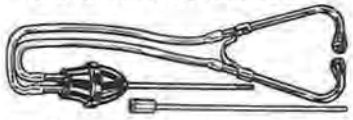


Figure 1

Sensitive
MECHANIC'S STETHOSCOPE



Long 2-pc. probe reaches to 11-1/2". PVC diaphragm. Comfortable plastic ear plugs.

Figure 2

SEND YOUR TIPS TO: Jingle Joe, AWI Central, 3700 Harrison Avenue, Cincinnati, Ohio 45211.

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.

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
SUBJECT MATTER: The design and philosophy of lathe cutting tools. A discussion on various kinds of steel.

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.

A DETAILED DESCRIPTION OF EACH TAPE IS AVAILABLE FROM AWI CENTRAL.

The Care and Feeding of Mainsprings

by

John R. Plewes

Clock repairers generally have a few of the most commonly used mainsprings on hand, usually stored in the same configuration as they were received—namely, that seen in Figure 1. Unless they arrived in a labelled box, a tag showing width, thickness, and length should be attached to them immediately upon receipt. Sometimes, however, urgent matters intervene, and springs of unknown sizes go into stock. Other mainsprings continue to drive their clocks as they measure this strange phenomenon we call time, until one such mainspring breaks—and suddenly our "unknown" is a likely replacement for it.

Releasing several restrained mainsprings to measure them and then recoiling them is wasteful of time and effort. Fortunately, a good estimate can be obtained without undoing the spring at all.

The width of the spring can be readily measured with a rule or a micrometer and the thickness can often be measured at point E in Figure 1 with either a micrometer or a Vernier caliper. If the gap E is too restricted for measurement purpose, measure the distance G with a Vernier caliper instead, and count the number of coils of the spring at the same point. This is done by counting the clicks as a toothpick or pegwood stick is dragged slowly across all the spring coils which lie in contact with each other. Dividing the dimension G (in thousandths of an inch) by the number of coils will give the spring thickness.

Figure 1

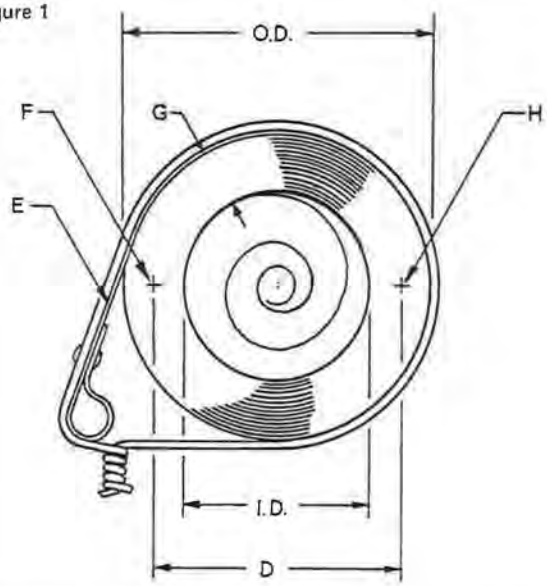
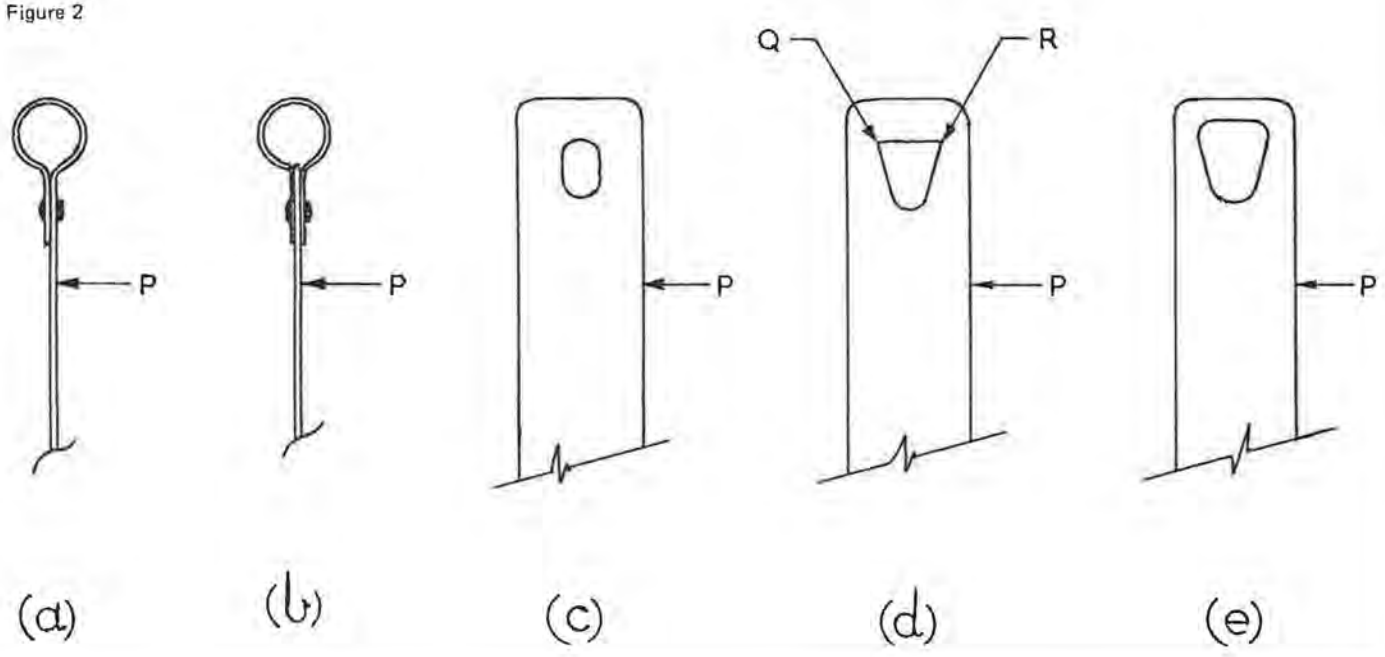


Figure 2



To find the length we first find the average diameter of the close-packed turns. A sufficiently accurate method is to eyeball the points of a Vernier caliper onto points F and H in Figure 1, thus measuring the diameter of the average coil. This is good eye training, and your score can be checked by shifting the caliper points left or right diametrically so that one point touches the inside coil and the other, the outside coil.

The length of the close-packed turns is now found from the formula: $L = \pi DN$

where
- L = length in inches
- $\pi \cong 3.14$
- D = diameter of an average turn in inches = length FH
- N = the number of close-packed coils

Measure the length from the loop end to the close-packed turns–this is usually only an inch or so; then measure the free central turns. This can be done with dividers or by counting the number of estimated inches with pencil marks. The free central turns on a new spring may only measure about 4", whilst on a well-used spring they may add up to a foot or more.

Adding the three dimensions found above will give the total length of the mainspring to within a few inches. Practicing with a spring of known length will verify the method. Another check is to compare your estimates with the standard lengths found in supply house catalogs.

When the correct spring is determined, it should be released, degreased, checked for rust, and regreased before it is put into service. This is because there is no way of knowing how old the original manufacturer's grease is, and it could easily be old enough to stop the clock.

Although a broken mainspring generally means its replacement, a repair is sometimes feasible. Repairs to the inner, arbor end usually fail, as the remaining turns are forced to conform to an even tighter radius than before. As long as the mainspring, when repaired, has not lost more than say 7% of its length (measured from its *outer* end), a successful repair can be made. This involves forming a new loop, as in Figure 2(a) and (b) or by drilling and filing a new hole, Figure 2(c). In all cases the spring must be softened to the point marked P by heating it red hot and allowing it to cool slowly. Note that the use or re-use of a clip, Figure 2(b), saves an inch or so of spring length compared with the Figure 2(a) configuration, where the loop is formed from the spring itself over a rod or drill shank of suitable diameter. Both types of loop are held closed by a centrally placed rivet.

The new oval hole at Figure 2(c) is ideal. The all-too-frequent (and in new springs, no less) Figure 2(d) hole is unacceptable because it will tear from the sharp corners Q and R. Manufacturers should know better than to use such holes, for they are unsound. Before installing such a spring, cut the offending hole off and make a new one as shown in Figure 2(c). The new hole should only be large enough to accept the barrel hook; anything unduly larger will only weaken the spring. The Figure 2(e) hole should be likewise cut off and renewed, for it is too large and too near the end of the spring.

Whilst it is possible to punch holes through unsoftened mainsprings, there is a grave risk of cracking and consequent failure; the softening and drilling sequence is safer when mainsprings are concerned.

BULLETIN BOARD

A. NEW REQUESTS

NOISY MUSIC BOX

Jim Campbell of Lowell, NC has a couple of music boxes which the customer says makes too much noise. Jim replaced the music movements but the new ones were just as noisy. They sound like the fan wheels are making humming sounds. Can anyone suggest a solution?

'LOL WATCH CRYSTAL CATALOG

Chip Colby, Beaverton, OR, is seeking a copy of a catalog for 'LOL Watch Crystals. If you can supply, drop us a note. We will photocopy the first one we get, keep one copy for our files, send one to Chip Colby, and return yours to you.

LATHE TAILSTOCKS & INSTRUCTIONS

Leo Jaroslaw, Acton, MA, is seeking a source for a tailstock to fit the Derbyshire (10 mm) Lathe.

Also, he seeks a source for a concentric (in line) tailstock for a Boley f-1 lathe and an instruction book for this Boley lathe.

"EL" CALIBRE 21 WATCH

Jim Stanley of Fort Wayne, IN reports that he has a lot of affluent customers who return from cruises to the Virgin Islands with watches that have rotating bezels of different colors. Now their taste has shifted to a quartz watch with a "stone-type" dial. Being thicker, it needs a longer center post. The calibre is marked "EL 21." Can anyone identify and name a source?

L.B. TATE – SUPPLIERS OF WATCHMAKER MATERIALS

Sheldon Warren, Ft. Myers, FL, used to do business with a watchmaker supply firm known as L.B. Tate. They were from somewhere in the Carolinas. Sheldon would like to know if the firm still exists, or can their successor be identified?

B. RESPONSES

"LOUIS BERNET" QUARTZ WATCHES

We received several more responses for information on this brand of watch. We appreciate the responses we have received.

CUSTOM CUT 32-TOOTH ESCAPE WHEEL

We received several responses from individuals who were willing to cut this escape wheel for William Crane. We also note that the subject is covered in the Huckabee "Random Clock Talks" Tape No. 22.

CAST BRASS BEZELS

We received offers to custom cast such bezels and to supply from existing stock.

REBUILDING ANSONIA "SWINGER" PIVOT

One member offered his assistance in helping Harold Thompson with this project.

CONVERTING OLDER ROLEX CROWNS

We were chagrined (but happy) to learn from one of our staff members that the *HT* published the solution in an article by Robert Mohr in April 1989, page 5. It seems that James Skinner and I need to read the *HT* more carefully during the New Year.

SINGING BIRD CAGES

We received this additional response from Jandi Goggin of Huntington, NY who writes as follows:

In response to your request for a firm that repairs singing bird cages:

I've been repairing/restoring bird cages and "snuff box" style singing bird mechanisms for over 30 years. I've been a subscriber to your magazine for only three years.

Anyway, these singing bird cages and boxes were bought as novelties. After having to wind these for a short serenade of about five minutes, the novelty wore off. They were relegated to hanging on a hook or placed on a shelf until guests or children arrived. Thus, very little wear is found on the mechanism, but the animal skin bellow covers soon dried out and gaps appeared that defeated the necessary airtightness needed to produce a good "song."

You do not find this lack of wear on clocks which run 365 days a year.

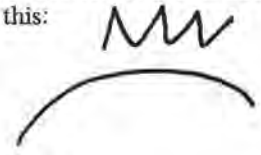
So the major problem is to recover the bellow's 3 chambers properly and to replace 5 to 6 valves correctly. It's "tricky" and very frustrating if you don't know how.

Can anyone identify the manufacturer and name a source for parts?

C. ITEMS STILL NEEDED

KOREAN CLOCK MOVEMENT ITF 370-M11

Loal Huffman, Santa Maria, CA, has a School House Clock marked ITF 370-M11. The strange thing about this clock is that it has a large wheel at the rear of the center wheel arbor (approximately 1.687" diameter) which has 64 teeth which have a sharp point, straight sides, and which appear to be cut with a "V" cutter. The cuts are very rough. The profile looks like this:



HADDON CLOCK MOTOR

Harold Thompson of Owalonna, MN asks: Does anyone have specs for the novelty Haddon clocks of the 1940s? It looks as if the style "C" Syncron motor will work, but I would like to have a chart showing the rotation and RPM of the old Haddon motors.

ADAPT A MODERN ELECTRIC MOTOR TO A 1930 VINTAGE INGRAHAM CLOCK

Mr. Callaway needs advice on how to adapt an electric clock motor presently available to an Ingraham synchronous, hour/half-hour striking clock, model SS T7. This clock dates back to the mid-1930s.

SWISS TRADEMARK?
We believe the trademark below to be that of Hahn of Switzerland. Can anyone confirm and give more details?

Montin 

PLATO CLOCK BY JUNGHANS
Charles Toms, Allentown, PA, is seeking the proper mainspring measurements (or mainspring) for a Plato clock produced by Junghans in Germany. There are a number of "Plato" clocks around which have been produced by a variety of manufacturers. This one is by Junghans.

"ADOLFO" GERMAN-MADE WATCH
Jim Stanley, Ft. Wayne, IN, is seeking the name of the U.S. agent for the German-made "Adolfo" watch.

TWO NOVELTY CLOCKS
Charles Field, Ft. Branch, IN, is seeking history and pertinent information about the two novelty clocks shown here.


Lanshire Synchronous Time


Figure made of white metal, no other details.

DO YOU HAVE INFORMATION REGARDING THIS MONTH'S REQUESTS?
DO YOU NEED INFORMATION ABOUT ONE OF THIS MONTH'S RESPONSES?
If so, send a self-addressed stamped business-size envelope and your request to the address below

BULLETIN BOARD
Horological Times
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Cincinnati, Ohio 45211

Water carriers, Meknes, Morocco.

1990 AWI TOUR

Basel, Switzerland
Yugoslavia
Casablanca

17 days: April 16-May 1, 1990

The following is our initial draft of the upcoming 1990 AWI Tour. Olsen World Travel, who arranged our highly successful Russian tour, will handle all the details. Deluxe hotels and full a la carte meals will be provided for breakfasts, lunches, and dinners.

From New York we embark for Dubrovnik on the spectacular Dalmation Coast of Yugoslavia. Dubrovnik has the atmosphere of a "Riviera" resort. Its climate, wonderful scenery, and fine hotels contribute to the city's popularity, as does its great architectural and historic riches. The remainder of that afternoon is for leisure, to relax, or hunt for antiques–horological and otherwise–throughout this medieval city. Tonight we are invited to a get-together reception, followed by a welcome dinner hosted by our tour manager, Jim Gibson, who has been with us on many previous tours. Our hotel as of this writing is The Excelsior.

April 18th, DUBROVNIK–Our walking tour takes us through the Old Town where no autos are allowed. The town is surrounded by thick walls and defense works dating back to the 12th century. We continue on some stone slabs worn by the passage of time and view the Franciscan friary, housing one of Europe's oldest pharmacies, baroque St. Blaise Church, Sponza Palace, 15th century Onofrio Fountain, and the Rector's Palace, the finest building in the Old Town. We conclude our sightseeing with a panoramic drive offering wonderful vistas of the sea and the city below.

April 19th, SVETI STEFAN EXCURSION–This is a medieval fishing village on the southern Adriatic Coast. The entire village has been transformed into a luxury hotel, adding to its appeal and charm. With its beaches, entertainment, casino, and excellent cuisine, it is hard to imagine that this was once a pirate's enclave.

April 20th, DUBROVNIK/SARAJEVO–We will motor along the coast and view the crystal clear Adriatic Sea, dotted with beautiful islands, an area considered to be among the most beautiful in the world. After turning inland, we motor to Medugorje where thousands have witnessed the miraculous phenomenon of the apparition of the Virgin Mary. We continue on to Mostar, once capitol of Herzegovina, where we see the spectacular 16th century fortified bridge spanning the Neretva River built by the Turks and noted for its graceful arches. Proceeding to Sarajevo, we see where the shot was fired that killed Archduke Ferdinand (triggering World War I). The River Mickacke, which flows through the city, is spanned by several bridges. It was on the Principov bridge on June 28, 1914 that this tragic event took place.

Sarajevo was the site of the successful winter Olympics in 1984. The entire area displays a pleasing blend of Near Eastern and European architecture and lifestyles. It's one of the most interesting cities in Europe. There are balconied houses, mosques, minarets, an Oriental Old Town, and an intriguing bazaar, world-famous for its craftsmen and artists in handicrafts. We stay at the Holiday Inn.

April 21st, SARAJEVO/BELGRADE–Travelling by motor is an interesting opportunity to view the countryside and some rural areas as we approach the nation's storied capitol. Belgrade, one time capitol of Serbia, rises above the Danube and Saya Rivers. The city is the oldest in Yugoslavia, founded by the Celts in the fourth century. Standing at the "crossroads" of East and West, Europe and Asia, its history is one of the stormiest in older Europe. We stay at the Intercontinental Hotel.

April 22nd, BELGRADE–This city offers excellent sightseeing including a morning tour of the Kalemegdan Fortress and its beautiful park, site of significant historical monuments. We view the Herald of Vistory monument towering over the river, the handsome Topcider Park, and much, much more. We will visit Tito's "House of Flowers" suburban tomb. We will also visit the open-air exhibition of old arms and the tomb of Tito. The parliament building, St. Mark's Church, Belgrade's Philharmonic Hall, Open University, and Republic Square are other memorable sights during our tour. This afternoon is free for shopping or relaxation.

April 23rd, ZURICH/BASEL–This morning we fly to Zurich and then to Basel, Switzerland's second largest city. Basel is situated on the banks of the Rhine River and is the meeting point of three countries–Switzerland, France, and Germany, each reached within yards of each other. We'll stay at the Hilton Hotel.

April 24th–This day is spent as the guests of the Basel Fair management with full inspection of the 18th European Watch, Clock and Industrial Equipment Fair. There we will see the latest in horological and jewelry designs, technology, modern handmade horological works of art and "tour-de-force" items, meet trade leaders from the world over, and as guests of the Fair's management we'll hear an address by the Fair director during a fine buffet luncheon. Those who wish may split that day to view the fine clock collection at the nearby Reichmuseum viewing the famed Geschwind Collection.

April 25th, BASEL/MOROCCO–Time permitting, before an afternoon flight to Morocco, we'll visit a horological museum or nearby watch factory before emplaning to Morocco. We land in Casablanca, Morocco's largest city, with its important Atlantic harbor and over two million inhabitants. Now it is predominantly modern and an important seaport, although very attractive. We pass the city center at the waterfront and view the famous El Hank Lighthouse. The Hyatt Regency Hotel will be where we stay.

April 26th, CASABLANCA/MARRAKECH–The city of Marrakech will be the center of our touring after a morning surveying the sights of Casablanca, motoring past tent villages, adobe huts with camels working the fields in one of the world's most intriguing cities. Marrakech, dominated by the snow-crested High Atlas Mountain range, is a memorable sight. Free time this afternoon is a must for exotic shopping, after which we'll be escorted to the fascinating Djemaa-el-Fina Square to see the famous sight; staying at the Es Saadi Hotel.

April 27th, MARRAKECH–An extraordinarily beautiful city, Marrakech is ornamented with orange trees and palm trees, broad boulevards, snake charmers, magicians, native dancers, and water vendors with their goatskin bags and shiny brass cups. There is also the city square where we see the imposing Bahia Palace, the Medina, the Dar Si Said Museum. Also we'll visit the tombs of the Saadian princes, Koutoubia Tower, and Menara Gardens. The afternoon is at leisure for shopping or "antique hunting." In the evening we are escorted out of the city to the Restaurant Chaouia for a typical Morrocan "fantasia" complete with dinner and special forklore entertainment.

(Please turn to page 27)

Novice Watchmaker

James Adams, CMW, CMBHI

Estimating the American Pocket Watch

The principles of operation and appearance of the American pocket watch is exactly the same as other detached lever wrist or pocket watches. But the method and materials of construction are quite different from today's timepieces. Remember, these timepieces were produced from the late 1800s on through the 1930s. Because of their age and this difference in material used and construction, a more careful and different kind of estimating is called for.

Let us now run through a system for repair estimating. To begin with, it seems that the third or fourth sentence from the patron, after asking you to "put a squirt of oil in it," will be "Granddad had this about 80 years ago as a boy. Can you tell me how old it is?" Or, "I've seen a picture of Aunt Elviney wearing this, the picture was taken about 1921. How old is it?" So, friend novice, be prepared for that kind of request. I suggest you secure a production date list or lists of the American pocket watch as a tool of the trade.

Now after the squirt of oil request, you inform the patron that there's more to it than that. Well, in turn, he will say, "My Grandpa used to oil his clock. Once a year he would put a jar cap full of coal oil in the clock to oil it, and it worked fine." Maybe he's implying you should find a jar cap to fit inside his pocket watch and fill it with coal oil.

You think I'm joking about the coal oil. Well, maybe so in the pocket watch, but not about the clock–although, who can say what people sometimes think?

Back to the business at hand. First, examine the outer condition of the pocket watch. Many times the crown needs changing, sometimes the bow is in a poor and unsafe condition, and the crystal may need changing. Look at the case, in general, for problem areas, especially in hunter cases. Be sure to include these costs in the estimate. They (as watch components) are as important as the movement. Not to consider a worn crown or bow will (and I'll bet on this) return as a comeback. The patron will expect you to furnish these parts because you fixed his watch at "an awful high price." Maybe you're the type that needs to get burned before the lesson sinks in.

Next step is to try to wind the watch. Is the mainspring broken? Is it fully wound already? Check the setting mechanism, either lever set or crown set. If crown set, does the crown and stem do their respective tasks? If it will set but not wind or vice versa, it may indicate a poorly adjusted sleeve. Does the stem keep popping into the setting position? I'd bet on a bad sleeve. In reference to the mainspring on your winding up test, remember these old timepieces were fitted with blue steel mainsprings. Chances are very good that it might still have one in it. If so, it has long ago become set and lost virtually all its driving power. Keep that in mind.

Let's back up a little now and go back to lever set pocket watches. Most people don't know a thing about the fact their pocket watch sets by a lever on the side of the movement. Be sure to bring this point to their attention. It's quite common, for me at least, to have the patron complain they can't set the watch, only to be told and shown it's a lever set movement. It astonishes many people to learn this fact.

Next, examine the condition of the dial. Most of these are of porcelain and many have hairline cracks or even large chips knocked out of them. Point out the fact that you can't do a thing with the hairline cracks, but you might be able to fill in the missing chips. Now, some patrons will tell you to go ahead, and others will say "No, because Grandpa's dog, Buster, knocked it off the sideboard and broke the face and I want to keep it the same." So never repair a dial without specific instructions to do so. Some dials are of sterling silver and it may be that it is possible for these to be cleaned up. Again, some patrons won't want this type of work done.

The next step is to look at the hands. Are they all there? Are they rusty? Are they the type you could replace with the same or nearly the same style hands?

Now, let's look inside this timepiece. Look carefully at the overall appearance of it. Is there any rust visible? Examine the train jewels. It's very common to find cracked jewels. Remember, you can only see the bridge side of the movement in this regard. Jewels in the American pocket

watch were all set in metal bushings, usually brass. Once in a while, in very high-grade watches, these bushings might be gold! Let the power down and check the sideshake of the center wheel. Sometimes wear caused by a cracked or chipped center wheel jewel or a simple brass bushing can and does cut pivots where they bear on the jewel or bushing walls. If the pocket watch has laid around for a long time, any oil that was once there has turned to a dry, hard crust. So, you might have to soak the pivot holes with hairspring cleaner to partially clean out the gunk to try and get a truer picture of wheel conditions.

It's mandatory to remove the balance complete from the watch for examination. Balance springs (hairsprings) were made of blue steel and subject to rust. This happens often enough to be a repair factor. Another thing that is very common is cracked, chipped balance hole jewels. Again, these are set in their individual brass settings. There was no such thing as friction jewels. Let me tell you a little story here about pocket watch jewels. While I studied watchmaking in school, we trained on the American pocket watch. The only jewels I'd seen and was instructed on was the brass setting jewel. Even part of the lathe course dwelled in detail on making these brass bushings. So, one day I was introduced to the friction jewel. What heresy . . . naughty, naughty . . . they will never amount to a thing . . . they will fall out . . . I thought I was here to learn watchmaking, now this . . . Really, this was my reaction to friction jeweling. Can you imagine what a really old gaffer though of this if I, a mere greenhorn, reacted that way?

Back to business. It also was common to find balance staff pivots riveted into the balance hole jewels. Ya, riveted! If a staff were relatively soft and a drop shock occurred downward on the balance staff, the pivot of that staff would receive the total weight displacement of the balance complete, in one shocking blow, directly on the diameter of the pivot and literally riveting it into the hole jewel. By any comparative standard, these balances are very heavy units. Another area of concern is the roller jewel. It is very common to find these loose or broken.

Earlier in this series I commented that to work on these machines made you feel like a watchmaker. How true! How wonderful! How pleasingly restful to work on these!

The major areas of estimating concern are crowns, bows, sleeves, jewels, mainsprings, balance springs (hairsprings), and balance staffs. Beyond these areas fall the secondary repair considerations–banking pins, guard darts, PF&A fit to roller, dial trains, and cannon pinions.

Sometimes it's sad to complete the repairs of these. The sense of melancholy at having to imprison this jewel of a movement in a freshly polished case somehow seems . . . oh well. I guess that is why we are here.

In upcoming articles of the "Novice Watchmaker" we can touch on the various areas of repair. So again novice, if you can secure an American pocket watch, do so. Get something in an 18 size or 16 size. Not many so-called watchmakers have the ability to properly service these. It could be a nice added source of income for you.

SHOP TALK

Wes Door, CMW

Sharpen Up For 1990

Starting the New Year seems an appropriate time to discuss sharpening up our tools and our thinking abilities in the way of books to read and seminars to attend.

TOOLS–Let's start with our lathe. If we have a broken lathe belt we need to replace it. I have discovered an excellent belt material and seal. It may be purchased from industrial suppliers like Bearings, Inc. who have several hundred stores throughout the United States. The belt material comes bulk and costs about 20 cents per foot. I bought 4 feet which was about twice the amount I needed. The size I use is 3/16 diameter.

Since we need to place the belt over our lathe pulleys *first* and then seal the ends together, we need a good seal. The seal to hold the belt together should be purchased from the same supplier. This seal is Loctite® 404, and comes in a yellow bottle (Figure 1B). This small yellow bottle costs about $12.00 which should be a lifetime supply–even if you share it with lots of friends. This is the expensive part, but I think it's worth it.

First we cut the belt to length with a sharp single edge razor blade. Then apply a small amount of the Loctite® to each end of the belt, and hold the belt ends together with our fingers for about five seconds. It's nice to have a belt material that will not break easily and slap us in the face. Also, the belt will not make a "click-click-click" sound as it's rotating.

For the purpose of this article I tested the strength by pulling very hard and did manage to break the belt. Then I recut the ends (with a razor blade) again, but this time on a bias. So far it hasn't broken, even when exerting lots of abnormal pressure. I still have the habit of closing one eye, just in case.

Another useful tool is a detent tool. Figure 2 shows a detent tool I designed to help in the removal of a broken stem. You use this by placing the movement over one of the pins and pressing down on the movement while pulling the broken stem out of the watch with hairspring tweezers (not for detent screw types; just for spring-loaded types of detents).

SHARPENING TOOLS–Some like to use our lathe with a 7/8" cut-off wheel to sharpen screwdriver blades, tweezers, needles, etc. Figure 1C shows such a wheel set up in our lathe. I personally use a flex-shaft assembly which is on the right side of my bench. It is held horizontally to my bench with a broom handle type of a clamp. By keeping a cut-off wheel in its jaw chuck, it is always ready to use. It's easy to use for other work by pulling this flex-shaft handpiece out of the horizontally mounted holder. It is excellent and very fast for sharpening screwdriver blades, etc. while in this horizontal holder. Some prefer the hand method by using a sharpening stone for screwdrivers and especially for gravers.

Figure 1

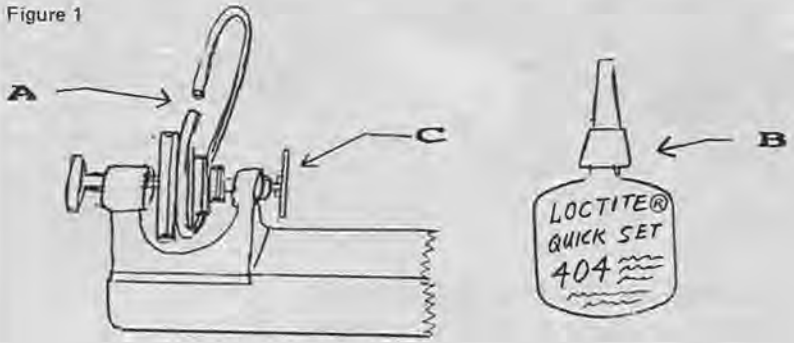
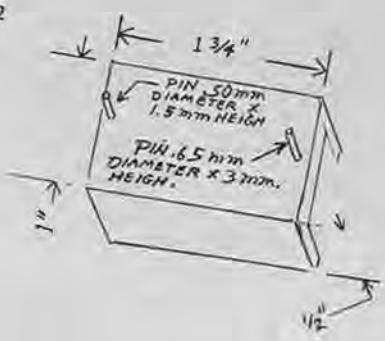


Figure 2



SHARPENING TWEEZERS–To resharpen tweezers the tendency is to sharpen the points. This is important. However, we should also trim down the area shown in Figure 3A, especially if we are working on hairspring tweezers. Some prefer to buy a new pair or send the old ones out to be resharpened.

TO SHARPEN CARBIDE–Although carbide is very hard, the edges can break off quite easily while using and needs to be properly and accurately resharpened. To sharpen carbide gravers requires special sharpening wheels. Wholesalers should be able to supply us with the proper ones.

If we have crystal cutting equipment, with a diamond wheel we already have our sharpening wheel. This is an excellent machine for this purpose, as this diamond-impregnated wheel does a great job.

SHARPENING UP OUR THINKING ABILITIES–This is a good time of the year to make plans for attending some of the AWI seminars. After sitting at the bench for many years one would think that I would have learned "all there is to know about watchmaking." Unfortunately, this isn't so.

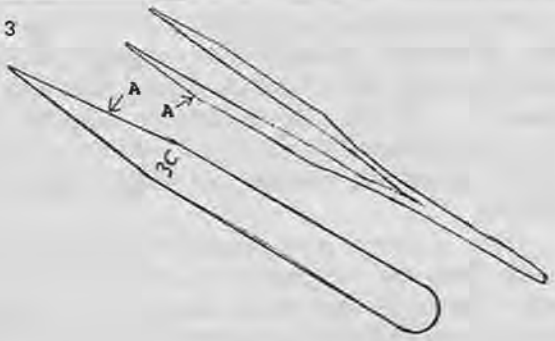
Recently I attended Jim Broughton's seminar on dial feet. I signed up for the course after having trouble with my homemade equipment by discoloring two dials and not having some of the dial feet hold on tight enough. I needed help and Jim's AWI workshop seminar supplied the help needed.

After completing this one-day course, I drove four hours to return home, after which I went to my shop, and you guessed it: I just had to try out my dial feet soldering equipment on the two customers' jobs that required dial repairs. They were perfectly centered and the solder flowed properly. I did several other dials since, and with equally good results–so a big thanks to Jim Broughton and AWI for such a fine course.

I was a little embarrassed to write about this and thus show my ignorance, but by doing so it might encourage others to sign up for courses. If a course for a subject that we are interested in is not yet scheduled for our area, we need to let AWI know. Also, AWI regional seminars should be considered by all members. I know the one in our Northwest area was a great success.

We learn from each other, so let's all "sharpen up" for 1990.

Figure 3



Old Watches

Charles Cleves

Hidden Values

Many retiring or near retiring watchmakers and jewelers are sitting on valuable items that they either give away when selling their store or throw away before they sell out. Owning a jewelry or repair shop for 30 to 40 years allows you to accumulate a lot of desirable collectibles. Some of the areas that are often overlooked are the following: old catalogs and advertising materials, old watch boxes, fountain pens, antique jewelry, loose gemstones, gold-filled scrap, and wrist and pocket watch movements.

Of the first items discarded are the stacks of old catalogs that have been piling up on the shelves and in the basements. The more valuable ones are wristwatch catalogs, especially ones from the 1920s to the 1950s, with pictures of the watches from that year. I recently had a Breitling catalog from the 1950s with pictures of all their chronographs, including a picture of a double split second moonphase calendar watch. There were many pictures of every kind of chronograph you could want. I sold that catalog for $300.00. Old Patek Philippe, Vacheron & Constantin, and Rolex catalogs are also very valuable. The older the better. Catalogs from the past 10 years aren't valuable unless they are from the high-grade watch companies.

A couple of years ago a gentleman came to me with many really nice watch boxes for sale. I paid him approximately $200.00 for them. A few weeks later he sold me some more of them. While looking through the boxes, I found a paste-on label of an elderly watchmaker about 20 miles from me. I decided to visit him and inquire if he knew about the boxes. He told me he had been cleaning out the basement and throwing them away. The local junk dealer saw the pile of interesting looking junk and had enough sense to take it before the garbage was collected. A small sampling of some of the current prices follows.

Patek Philippe boxes: $50.00 and up
Rolex: $25.00 and up
Vacheron, Piaget, and Audemars: $30.00 and up
Gruen curvex: $10.00 and up
Hamilton: $5.00 and up

The more interesting the box, the higher the value.

Another area is that of fountain pens. Old fountain pens are becoming more and more desirable all the time. Many old-time jewelry stores sold and repaired these pens. The most desirable names are Conklin, Parker, and Waterman. A couple of other names to look for are LeBoeuf and Eversharp. The most sought-after pens are the early Parker pens. The gold and silver filigree overlayed pens and the mother of pearl inlaid are the ones to look for. The larger the pens and the more colorful, the more value they have. Mandarin yellow and lapis blue are two of the scarcest colors. Pearlized and marblelized finishes add value also. The rarest of the pens are the ones with hand engraving from the 1920s and before. A Parker pen with two snakes engraved up the barrel and cap recently sold for $3750 (in mint condition). There were also some made with swastikas and various pictures engraved on the sides. In general, the larger pens had larger nib sizes. Zero was the smallest and 12 was the largest. While these few names aren't the only ones, they're the main ones. Pen repair parts and tools are also of interest to the collectors. Countertop cabinets, advertising materials, and window displays are also desirable.

There is also a great demand for antique jewelry nationwide. Clean out the corners of your safes! Much of the broken jewelry is now worth restoring and repairing. Everyone has a small corner spot in their shop where antique jewelry and timepieces could be displayed. You'll be surprised how much interest there is. Don't sell anything to your

retail customers that is not in good shape. If you have broken items that you either cannot repair or don't want to repair then sell them to other dealers who will.

Old-time jewelers usually have an abundance of loose stones and cameos. At one of our local chapter meetings we had an evening where members could bring loose color gemstones and use my testing equipment to identify them. We had a refractometer, microscope, polariscope, and heavy liquids with us. A couple of other gemologists brought refractometers too. It was a very interesting lesson for all those present. We discovered a few better stones among the junk that the members brought in to test. It might make for an interesting evening for your local chapter if one of your members would volunteer to run this type of program.

Another area of great return that is often underestimated is gold-filled scrap. There usually are many usable pieces found in large accumulations. You have to sort it out to get the best price. Put all of your items that are 100% gold-filled (no steel or base metal of any kind) in one container and all of your watch bands and miscellaneous with steel attached in another. If you have 300-400 ounces of straight gold-filled, you can send it to a refiner. If you have a smaller amount it is better to separate it even further and sell it to a dealer. 1/20 12K gold-filled scrap or 20-year cases are usually sold for $6.00 per ounce at $400.00 gold market. 1/10 12K gold-filled and 25-year cases are usually around $13.00 per ounce. If it is not marked it is usually the lower price, provided it is gold-filled and not gold-plated. Gold-plated watch bands and scrap don't bring much per ounce but are still worth saving. Also some gold-filled scrap has good percentage of silver mixed in and some of the refiners pay you for the silver also.

Lastly is wrist and pocket watch movements. While the majority of movements are worth very little by themselves, there are some worth looking for. Pocket watch movements with ornate colored dials and gold dials are valuable. Also look for unusual escapements on early high-grade movements. Most high-grade Swiss watches are not very saleable or valuable when recased. On most American railroad watches, it doesn't matter too much if it's recased in a gold-filled railroad style case. On older Hamilton pocket watches, always look up the serial number to see if it's one of the low production models. Wristwatch movements are the most overlooked category. Patek Philippe, Rolex, Piaget, Audemars Piguet, and Vacheron & Constantin are all valuable movements. Chronograph moonphase and doctors movements can also bring good prices. If you are about to liquidate, pick out your saleable movements and then consider donating the balance to the AWI Movement Bank. You can deduct a fair value from what profit you make on liquidating or selling your store off of your taxes. Most people that buy stores today aren't interested in old movements. AWI could really use the movements to get their program going.

Even if you aren't in the position of retiring or liquidating, you might want to free up some capital for better purposes.

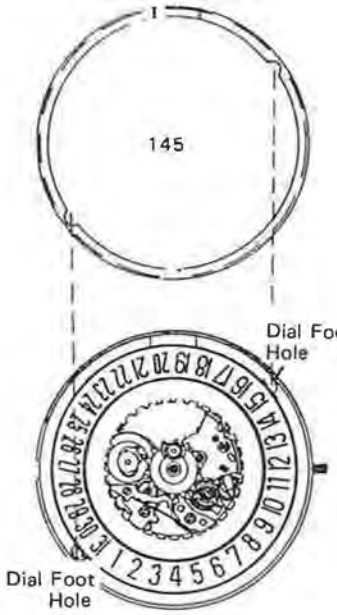
Courtesy
ETA SA Fabriques d'Ebauches
Marin, Switzerland

ASSEMBLING THE MOON PHASE MECHANISM

for the

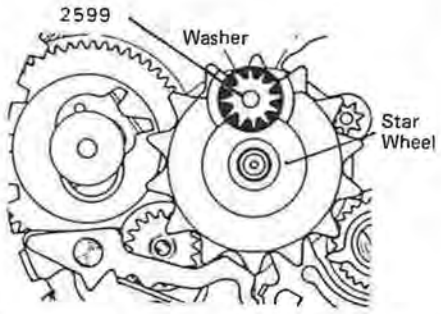
ETA 10½ LIGNE CALIBRE 955.419

Figure 1



Position the dial support ring (Part No. 145) with its notch at the 12 o'clock position as shown above left in Figure 1.

Figure 2



Fit the moon phase intermediate wheel (Part No. 2599) on the star wheel with the washer **facing down** as shown in Figure 2.

Figure 3

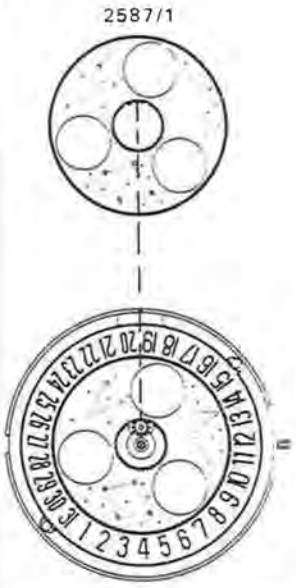
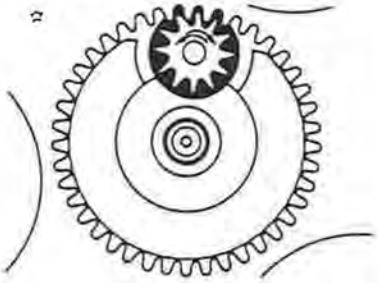


Figure 4



The moon phase indicator and the moon phase intermediate wheel must turn freely as shown in Figure 4.

Fit the moon phase indicator (Part No. 2587/1) as shown in Figures 3 and 4.

Figure 5

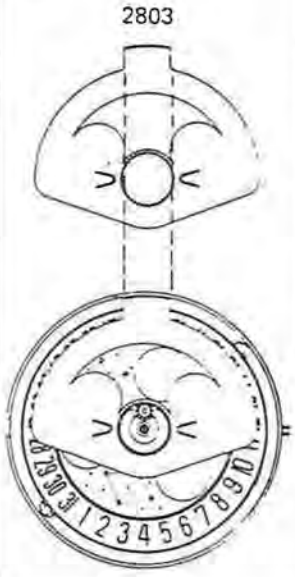
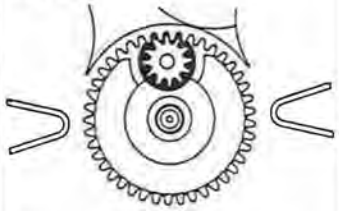


Figure 6



Note: The moon phase mechanism is maintained by the dial. For this reason, the dial must be perfectly **flat** and **centered.**

Position the driving crown for the moon phase intermediate wheel (Part No. 2803) noting that the finger must rest in the notch of the dial support as shown in Figures 5 and 6.

Seeking Prospective Candidates

For AWI Board of Directors

The committee involved with securing candidates to run for the AWI Board of Directors is seeking recommendations from the membership. If you plan to suggest a possible candidate, please send that individual's name and background to: Mr. Fred S. Burckhardt, Chairman, Nominations for Board of Directors Committee, AWI Central, 3700 Harrison Avenue, Cincinnati, Ohio 45211.

Each recommendation will be carefully considered by the committee. Candidates will be selected on the basis of their past local association or AWI experience, geographical location, present job status, horological experience, and willingness to serve.

Mr. Burckhardt must receive all recommendations before January 31, 1990 to be considered for the 1990 election.

MILITARY TIME

Marvin E. Whitney, CMW, CMC, FAWI

MECHANICAL MARINE CLOCK – MAX LOW, New York City, 6-inch, 8-day, ca. 1958

Max Low, 44 Fulton Street, New York City, who learned the watchmaking trade abroad, came to America in 1910. Shortly thereafter, he opened a watch repair shop, specializing in the repair of complicated timepieces. Soon he became interested in the marine chronometer, and, hence, turned his talents toward mastering the repair of this precision instrument. Being endowed with greater-than average business acumen and being located in the world's largest port city, he saw unlimited possibilities offered in the repair and sale of ship's chronometers and other nautical instruments. Thus, he expanded his business to include not only chronometers but barometers, marine clocks, binnacles, compasses, bearing instruments, binoculars, and gauges. In 1962, Mr. Low purchased the well-known New York chronometer firm of T.S. & J.D. Negus.

In the early months of World War II, when the United States was experiencing a critical shortage of chronometers and other nautical navigational instruments, Mr. Low was one of several nautical businesses that was given a letter by the Navy. This identified him as being requested by the Navy to seek out and purchase such instruments which in turn would be delivered to the Naval Observatory for possible purchase. Most of the instruments delivered to the Naval Observatory by Mr. Low and others were purchased for the Maritime Commission. These individuals traveled the countryside in quest of these much-needed instruments. Their efforts rendered an invaluable service to our country, to which we should be ever grateful.

At the conclusion of World War II, Mr. Low continued to offer chronometers, marine clocks, and other precision navigational instruments to the Government and other agencies.

The Marine clock shown in Figure 1, and sold by M. Low, consisted basically of an 8-day, 12-jewel movement housed in a black phenolic case. The case was dust- and moisture-proof and equipped with a cushioned, bulkhead mounting plate. The durable black-finished dial was marked with large white numerals indicating the hours 1 to 12, with a secondary row of smaller numerals running from 13 to 00 so it could be used with the 24-hour military time system. The movement was wound, set, and regulated from the back.

The 12-jewel, 3¾-inch round movement had an 11-jewel detachable escapement and an additional lower hole jewel for the fourth wheel pivot. The sweep second hand was mounted on the upper pivot of the fourth wheel, whose arbor passed through the hollow center wheel arbor and was the first wheel removed from the escape wheel pinion to insure positive action and eliminate backlash in the sweep second hand. The nonmagnetic escapement consisted of a monometallic balance fitted with a Breguet type hairspring. The balance assembly was protected from shocks by incabloc jewels. This simple and effective shock-resisting system provided safety to the balance pivots against lateral or vertical shocks, thus reducing the possibilities of any pivot breakage. TIMES

Figure 1. A dial and movement view of a 6-inch mechanical marine clock sold by M. Low, New York City, ca. 1958. The 8-day, 12-jewel movement was housed in a black phenloic case. *Photo: Orville R. Hagans AWI Museum, Cincinnati, Ohio.*

AWI 1990 TOUR *(Continued from page 17)*

Above: Dubrovnik, Yugoslavia; below left: Mostar's famous bridge; at bottom right: rural Yugoslavian.

April 28th, MARRAKECH/BEN MELLAL/FEZ–We will motor in the shadows of the High Atlas mountains through green fields past palm-fringed villages to picturesque Ben Mellal, Azrou, the attractive all-year resort of Ifrane to Fez, North Africa's oldest city, in a vast bowl-like setting. We wander about a totally different environment and witness thousands of Rifs and Berbers in flowing robes, veiled women, colorful markets, and exquisite Morrocan handicrafts. We stay at the Palais Jamais Hotel.

April 29th, FEZ–A local expert takes us through the heart of ancient Fez, a teeming maze of shops and stores called "Fez-el-Bali." Time seems to have stood still for hundreds of years as we pass carpet manufacturers, brass workers, tanneries, and ceramic painters. We also see the mosque and its architectural splendor. This afternoon is free to retrace your steps for second looks, shopping, or relaxation.

April 30, FEZ/MEKNES/RABAT–As we travel this morning to Meknes, the long-time capitol of Spanish Morocco, we view the attractive holy Islamic city which boasts a host of superb mosques. We continue to Morocco's capital, Rabat, where we visit the famed Casbah and see the lavishly ornate Royal Palace and gardens, the Tower of Hassan, and the ruins of the fabulous Yacoub el Mansour Mosque. Tonight we are invited to a farewell dinner party, staying at the Hyatt RegencyHotel.

May 1st, RABAT/CASABLANCA/NEW YORK–This is our departure day, hopefully with cameras filled with exciting views and unforgetable memories. As usual, Jim Gibson will be tour manager and Henry Fried will help things along in his own inimitable way. Tour costs and brochures will soon be available. Write: **AWI Tour Director, Henry B. Fried, c/o AWI Central, 3700 Harrison Ave., Cincinnati, OH 45211.**

HODGE PODGE LODGE

John A. Nagle

Looking Good

Did you ever have a good customer disappear on you? I used to advertise in local newspapers, more or less to let people know what I was still in the area. I had long ago stopped advertising in the phone directories as I just couldn't handle the volume of work that those types of ads produce. Anyway, I hadn't advertised for a long time and my wife suggested that I did. So, I did!

The very first day the ad appeared I received a call from an old classmate of mine who is quite the avid clock collector. It seems that when my ads stopped he assumed that I was no longer taking in work. It never even dawned on him to call me and ask! There are many people out there who will act in the same manner. Don't take your advertising lightly!

By now, most of you probably feel that you are being led into an article about advertising. Sorry—what happened when I stopped in to pick up my old chum's clock is what I'm going to discuss this time around.

He had increased his clock collection since I had last seen it, and he pointed to some of the clocks that had been serviced by other local clock repairers. He mentioned their names as he told me stories about each clock. I think he really expected me to comment on the competition, but that's something that I avoid like the plague. You don't gain in stature by dragging down the competition. Never, ever forget that! If you insist on belittling the guy across the street, be sure that you understand something known as a libel suit.

My friend then mentioned one thing that I really did appreciate. He said, "John, this guy seemed to do an OK job on the clocks, but they never did look as good as the ones you did for me. There was always dust on the case and he never cleaned the glass. They just didn't look nice."

When I was serving an apprenticeship under my Uncle Bill, one of the first lessons I learned was: **The clock has to look nice.** Your goal when working on a clock is to get it in as close to the way it was when it left the factory. The customer usually won't understand the repairs that you made to the movement. All you can really expect them to appreciate is the fact that the movement works as it should. Usually the customer will look for scratches and dents and the other signs of mishandling. Whether or not you put them there really isn't that important; they will blame you!

If the case is in the same state as it was when brought in, and the appearance and physical condition are OK, they will probably be satisfied, but not impressed.

It's when you take the time to do the extra little things that makes the moment when a customer picks up the clock so magical. The brasswork is shining and protected by a coat of lacquer, the glass sparkles, and the case is clean, polished to its proper finish. The hands are clean. All the case parts are secure and hardware is firmly attached. That's the beauty of a properly serviced clock.

If this seems like a lot of extra work, I can only suggest that you charge accordingly for your effort, be content with mediocrity, or just get out of the business.

Some of the things that a clock case requires are a whole craft unto themselves, but that doesn't mean that you can't learn.

As in anything else, it is important to have and follow a good routine procedure. When a clock is brought in to your shop, carefully examine the case. The case is seldom hewn out of one piece of wood. Rather, it is assembled from many parts. These sections should all be tight, firmly in position. If they are not, correct this by glueing and clamping. I used to use the yellow carpenter's glue in most of my wood repairing, but have changed to hot glue. You can purchase a hot glue pot from any of the woodworker shops.

There are many advantages to using hot glue, but two quick ones are: 1) this was the type of glue traditionally used, and 2) it is easily reheated and once again soluble, even after many years. This enables you to secure loose veneers by just applying heat. One of the advantages and sometimes disadvantages of our modern adhesives is that they molecularly bond to the surface of the parts being secured. This often creates unfortunate situations for future repairers. My intent in this article is to generally alert you to things that can be corrected. Few of these skills are instantly mastered. I suggest you obtain and study books on the subject and practice before working on someone's clock. I say this to caution, not to intimidate.

Secure that case. The base, feet, or any other supports should be solidly fixed. Tighten screws and glue the joints. When joints are glued, clamp tightly and allow to dry. Remove any excess glue as it will not accept stains, paints, etc., and will look pretty bad. Again, a woodworker's shop or catalog will contain clamps for every situation.

Brasswork on a clock case should be clean and lacquered. The quickest and easiest way to clean brass is to polish on a buffing wheel. Work buffed on a wheel charged with tripoli will remove old coatings and scratches and give a generally clean appearance. Follow this by buffing on a wheel charged with red rouge for a bright, clean finish. Scrub freshly buffed brass with a soapy ammonia solution to remove the rouge. Dish detergent with a shot of ammonia works pretty well. When dry, apply a coat of clear lacquer, and you're finished. Traditionally, parts to be lacquered have either been dipped in lacquer or the lacquer was brushed on. I have found the spray-can lacquers to be very good. They are easy to apply, dry fast, and are fairly durable.

Don't be so quick to polish all the metalwork. Some ornaments were goldplated, chemically colored, or just plain plated. Gold leaf, plate, or ormolu can be cleaned by carefully scrubbing with any of the commercial jewelry cleaners. The part should be polished down to the brass finish only if the plating is shot and the customer doesn't want it restored. You should talk these situations over with the clock owner. The owner may prefer that the worn plating remain, as it is original to the clock. I should point out that it is very important that the customer understands what you will be doing to his clock. This should be discussed before any work is started.

DIALS

Dials are another appearance item that can become very controversial. Porcelain dials can sometimes be cleaned in jewelry cleaner, which will remove dirt from hairline cracks and the dial will once again have that new look. However, some dials will have store and individual names, pictures, and emblems which will dissolve if subjected to solutions. Chips and deep cracks can be patched with dial wax and buffed lightly for a decent repair. Some work is currently being done using epoxies and dental amalgams. Paper and painted dials can be touched up to restore their past glory. I always prefer to restore an original dial rather than replace or repaint. I think the paper dial replacements currently available are pretty gross. In instances where a paper dial must be replaced, pay a dialmaker to do it properly.

Brass dials can be polished and lacquered, just as you would with the other brass items. Unless you have a large buffing wheel, it is best to polish by hand.

Silvered dials can be resilvered through the traditional paste method or by using one of the modern solutions that are available through the various parts houses.

Don't forget to replace the wax in the numerals when required. Use discretion, experience, and proceed carefully when doing dial work.

How do the hands look? Rusted, spotted, chipped, or mismatched? Blued hands are beautiful. If they are rusted or scarred, take a fine emery board and clean them to bare metal. Heat until they are a rich blue color. Some hands are painted and have become scratched and chipped after years of handling. Sand them smooth and repaint them to restore that original finish.

I don't know how someone can be happy with a spade hour hand and a maltese minute hand, but you see combinations like this all the time. With hundreds of hands available and your skills as a clockmaker, supplying matching hands should be an easy job.

Make sure that your dial washers fit properly. I usually match them to the color of the hands. When pinning the hands, use a pin with both ends rounded off. It is easier on the eyes than nipped-off ends. Hand nuts should have a clean appearance—no scratches or rough edges caused by slipping pliers.

Manufacturer's labels have become pretty collectable. At one time, these labels were lacquered or varnished. As it turns out, this didn't preserve them and is no longer suggested as a means of preservation. There probably isn't a surefire method. I pin a piece of clear mylar over the label. This at the least will keep fingers away from it. Ordinary plastic taped in place has two disadvantages. It traps moisture, and the gradual breakdown of the plastic will react with the label material. There are special inserts used by museums and libraries which help slow the pulp breakdown, but realistically, we are probably fighting a losing battle. There are some nice label reproductions available that can be used with good results.

Case finishing, touch-up pencils, and scratch-removing polishes are about it for the novice tampering with the finish of a case. Polishes and waxes have different results. Depending on the finish, you could cause real problems. Anything further, such as veneering, refinishing, etc. should be left to those who are experienced. Learn and experiment with your own clock!

All glass should be good and clean. Just be careful when cleaning glass that has silk-screened pictures or painted borders, etc. This surface is easily removed by cleaning solutions. Proceed with caution. Check retaining strips and tabs to insure that glass is securely fixed.

I covered a lot of material this time around, but if you use this article as a checklist, research the techniques used in the various repairs, and practice. I guarantee not only improved business, but also a greatly enhanced reputation!

Ask Huck

CLOCKMAKING BITS About...

By J.M. Huckabee
CMC, FBHI

BEARING CLEARANCE

Q: What is the proper bearing clearance for clock pivots? How is it judged and when is adjustment required? When should a bushing be installed?

A: These questions deal with a very large gray area, with essentially no values of absolute black and white.

Let's discuss the situation. I would like to state a clearance value as some percentile of the pivot diameter, but that could only hold true for a limited number of cases. It would seem likely that the degree an arbor could be moved away from upright would be a good measure; and possibly a visual or sideshake a suitable method. Yet all these ideas have their faults. The quality and design of the movement enters into our picture.

An aged craftsman once told me that a clearance of 2-10 degrees is right. That is, the arbor can be moved an angle of 2-10 degrees away from upright when standing in one plate. Again, other influential factors modify the values. Coarse gearing, thin plates, open mainsprings, dusty enclosures, and stressed movement supports all demand a greater degree of clearance. On the other hand, a clock with a dustfree case, barreled mainsprings, small pivots, large pillars, thick plates, rigid construction, and fine pitched gearing will command closer fitted pivots.

I consider the degrees of clearance as a reasonable check point. As we inspect a movement, this is easy to practice and serious wear problems are quite vivid.

The old American clocks work fine with the 2-10 degree rule, but I like to think it should be more like 3-8 degrees. Finer clocks may be better judged at 2-5 degrees. I believe most clocks would be more reliable near the higher limit than near the low one. It's easier to keep lube in the close-fitted pivot, but it's easier for stale lube to bind up the close one.

We all get jobs that represent oversight by other craftsmen. The most common problem I've observed in other workmen's jobs is in new bushings fitted too closely or not upright in the plates.

Our best teacher may be the "degrees of clearance" technique modified by the continual observation of known good bearings in the clocks we service. By observing the good as we repair the bad, we can develop a keen judgment very rapidly. On the other hand, there is no gray area when we encounter "hour glass" pivots, ringing and elongated holes. It's obvious these need the care of a skilled craftsman.

If you have a subject that you would like J.M. Huckabee to address in a future article, send it to "Ask Huck," c/o *Horological Times*, 3700 Harrison Ave., Cincinnati, OH 45211.

Our Readers Write

NO GENERATION GAP HERE

I have been retired for a period of seven years. Therefore, I am sorry but I can't be of any help to your surveys.

I would like to express my appreciation for the help AWI has been for me and the watchmaking profession.

I have a deep affection for those I have known in the profession and my interest in the organization continues, although I haven't repaired a watch for a number of years.

It would be a tragedy if the members didn't support AWI—that is, the members of the watchmaking profession. Young watchmakers who have recently entered the watchmaking profession, please know that your job is much easier because of the past efforts of AWI. AWI needs your support, and most importantly, you need AWI. Persuade your friends to join AWI. You and they will be glad you did!

Claude F. Miller
Gastonia, NC

I feel that congratulations are in order to you for: 1) putting out a magazine that gets better and better, and 2) providing technical assistance to this watchmaker.

When I first joined AWI in 1986 at the insistance of an old watchmaker (in his 90s) who has been one of my teachers, I was a bit disappointed at the lack of information concerning mechanical watches. However, the magazine has continued to increase its information in this area. I am a younger watchmaker who is primarily interested in servicing antique watches.

Your magazine is now a very useful and important part of my continuous learning and enjoyment diet. Many thanks for a job well done.

Susan J. Packer
Colorado Springs, CO

Why Not Drop Us A Note?

EXPRESS YOURSELF!

What you do like . . . what you don't like about the *Horological Times*.

36△XYZ

The symbol above is your assigned casemarking. It will not be necessary for you to change your present method of marking watch repairs. Merely add the symbol above as a prefix to the marking you are now using, ie:

If you now use a marking similar to this: B897C

You should now mark your cases: 36△XYZ B897C

The Federal Bureau of Investigation, and State and Local Police Officials ask for your cooperation in using the National Casemarking System. This is a chance for the watch repair industry to provide a unique public service.

THE AMERICAN WATCHMAKERS INSTITUTE
3700 Harrison Avenue
P.O. Box 11011
Cincinnati, Ohio 45211

THE IDENTIFICATION MARK SYSTEM

By

Robert L. Macomber
CMC

When you joined AWI a card similar to the above was provided to you for use in marking a clock or watch case. Many of us use it. However, others don't because they don't know how or don't realize how useful it can be to our customers.

First, the triangle mark is the key; it shows that the inscriber is nationally registered. The state number should be put in front of the triangle (e.g. New Jersey is 31). The individual letter combination designates YOU. You can follow the letters with your Customer Job Number. This facilitates quick identification.

Where do you place your mark? If you're a watchmaker it would be on the inside of the case. What about clocks? For run-of-the-mill mantel or grandfather clocks, the mark can be inscribed on the back plate in the lower righthand corner. On 400-day clocks, use an indelible pen on the bottom of the base; for cuckoo and wall clocks, mark the back of the case; and for carriage clocks use the bottom of the base.

Does it work? It sure does! There are many cases on record where stolen clocks or watches have been recovered and on other occasions victims of disasters or crimes have been identified.

Anyone can request an identification mark from AWI—they need not be a member. If you've forgotten yours, or misplaced it, just contact AWI Central in writing, and they'll give one to you.

I've been using my AWI mark ever since I joined AWI in the '70s. Just in the last six months, three of my customers have called in for my mark because their clocks had been stolen. My customers appreciate this service. After all, our customers are our reason for being!

Sure it takes time to mark a clock or watch—about five seconds! In this day and age of frequent residential robberies, we AWI members can really be of service to our customers by using our unique Identification Marking System. We urge you to USE it. You and your customers will like it!

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Archie B. Perkins, CMW, FNAWCC, CMBHI

Antique Watch Restoration © 1990

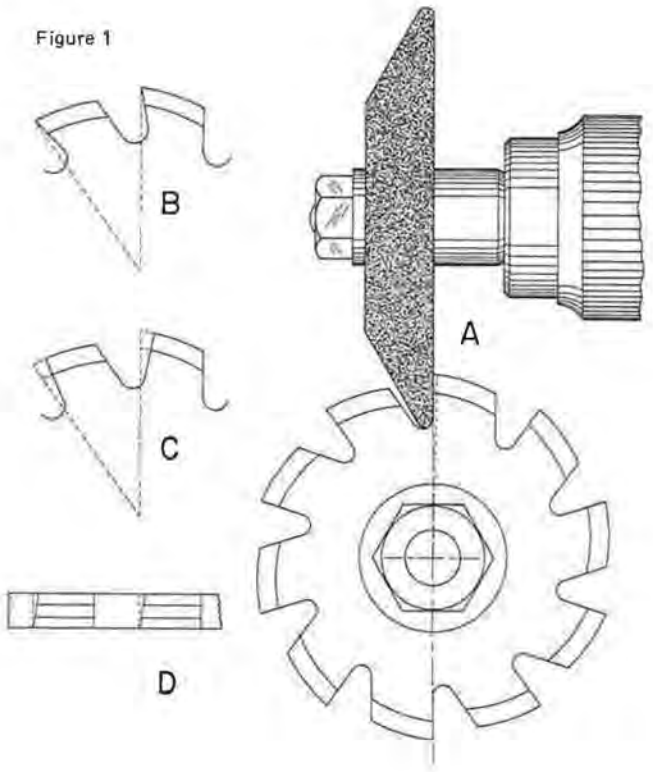
PART XLIX
SHARPENING CIRCULAR GEAR CUTTERS

The efficiency and life of a circular gear cutter is greatly affected by the way the cutter is sharpened and used. A cutter should never be used when it is dull or improperly sharpened. A dull cutter is likely to burnish the surface being cut and, in turn, the cutter will become burnished and further damaged. When a circular gear cutter is being used, it should make very little noise if it is sharp. The noise that the cutter makes increases as the cutter becomes more dull. If the noise that the cutter makes increases as it is being used, the cutter should be resharpened at once before it is further damaged. Note: This is more likely to occur when cutting steel gears. A correctly sharpened gear cutter will have evenly spaced teeth and all of the teeth will be the same length. Note: It is very important that all of the cutter teeth be the same length; otherwise, only the longest teeth will do the cutting. This causes rapid wear of these teeth and irregularity of cutting. The cutting faces of the teeth should be on a radial line running from the center of the cutter, and the cutting faces should be square with the flat sides of the cutter.

Figure 1 shows the correct method of sharpening a circular cutter. Note: Some circular gear cutters cannot be sharpened. The cutters referred to are the ones that are made by the pantograph method and do not have a constant profile. View A, Figure 1 shows the general shape of the grinding wheel used to sharpen gear cutters. The shape of the grinding wheel may be different for cutters which have different shaped spaces. The side of the grinding wheel which grinds the cutting faces of the teeth must be flat and square with the arbor holding the grinding wheel. The grinding wheel should run very true on its arbor. Before attempting to sharpen a cutter, one should also make sure that the cutter runs true on its arbor. The grinding wheel should have a medium grain and be hard enough to hold its shape well during use. A medium grain India (aluminum oxide) wheel does a nice job. Note: To sharpen carbide cutters, one should use a bonded diamond wheel. The grinding wheel is shaped for the notches of the cutter with a diamond wheel dresser. A diamond wheel dresser can be made by setting a small industrial diamond into the end of a brass rod.

When sharpening a wheel cutter, the grinding wheel is held on its arbor in the gear cutting attachment while the gear cutter is held on its arbor in the headstock of the lathe. To index a gear cutter when sharpening it, one would need a universal dividing attachment. One of these attachments is shown mounted on the headstock of a lathe in Figure 5. This attachment has a set of index plates which have a total of 18 rows of holes. The following numbers are in the set: 15, 16, 17, 18, 19, 20, 21, 23, 27, 29, 31, 33, 37, 39, 41, 43, 47 and 49.

Figure 1



To use this attachment, one would use the following procedure. First, determine the number of teeth in the cutter that is to be sharpened, which in this case is 15. Next, determine the index plate needed. Since the ratio of the dividing attachment is 40 to 1, one must turn the crank 40 turns in order for the headstock to make one turn. Therefore, if we divide 40 by the number of teeth in the cutter, we would find the index plate needed to index the cutter. Example: $\frac{40}{15}$.

When we reduce these two figures to their lowest terms, we would have $\frac{8}{3}$.

Now, by multiplying these figures $\frac{8}{3}$ by the same number, we would obtain the possible choices of index plates. We would have the following choices:

$$\frac{8 \times (5)}{3 \times (5)} = \frac{40}{15} \text{ or } \frac{8 \times (6)}{3 \times (6)} = \frac{48}{18} \text{ or } \frac{8 \times (7)}{3 \times (7)} = \frac{56}{21} \text{ or}$$

$$\frac{8 \times (9)}{3 \times (9)} = \frac{72}{27} \text{ or } \frac{8 \times (11)}{3 \times (11)} = \frac{88}{33} \text{ or } \frac{8 \times (13)}{3 \times (13)} = \frac{104}{39}$$

The lower number is the index plate and the upper number is the number of holes used to index the cutter from one tooth to another. One would select the index plate which has the highest number. This would allow the smallest amount of material to be removed from the face of the cutter teeth because when we move the index pin one hole, the movement is less than moving the index pin one hole in a plate with fewer holes.

If we choose the 39 hole plate, then we would have to move the index pin 104 holes each time we index the gear cutter one tooth. By dividing 104 by 39, we would have: $\frac{104}{39} = 2\frac{26}{39}$.

This would mean that we must turn the index crank 2 turns plus 26 holes each time we index the cutter.

When grinding the faces of the cutter teeth, the grinding wheel should be kept clean and moist with an oily cloth. The speed of the grinding wheel should be between 1500 and 2000 revolutions per minute. The amount of material removed at each setting should be very little. Remember that watch gear cutters are very small and delicate and must be sharpened and used accordingly. The flat face of the grinding wheel is lined up with a sharp male center in the lathe headstock, then the cutter on its arbor is placed in the spindle of the lathe. The index arm is turned until the front edge of a cutter tooth lines up with the face of the grinding wheel. Now, as the grinding wheel is turning, it is fed across the face of the tooth and brought back across the tooth. Then the cutter is indexed to the next tooth. After all of the tooth faces of the cutter have been ground, then the index pin can be moved one hole to reset the cutter tooth so the grinding wheel will remove a slight amount more from the cutter tooth. After this, we repeat the indexing and grinding until all of the cutter tooth faces are ground the same and the teeth are all the same length. Note: It may not be necessary to grind the cutter tooth faces at the second setting if the faces are all corrected the first time. On the other hand, if the cutter has been incorrectly sharpened in the past, the faces may need several settings and grindings to correct the condition.

When we refer back to Figure 1, one will see some faults in sharpening gear cutters. View B shows cutter teeth that have been ground by a grinding wheel that was not centered with the center of the cutter. In this case, the teeth of the cutter were undercut. This fault causes the cutter to cut too deeply. This condition causes the cutter to form teeth that are not shaped correctly.

View C, Figure 1 shows cutter teeth which have been ground with a grinding wheel that was off center in the opposite direction. This causes the teeth of the cutter to have negative relief. The cutter teeth will cut shallow and cause the wheel teeth to be cut with an incorrect shape. A cutter sharpened this way will appear to be dull and drag.

View D. Figure 1 shows cutter teeth which have been sharpened out of square with the flat sides of the cutter. This condition will cause the cutter to cut teeth which are incorrectly shaped. The dotted lines in the three views indicate the correct shape for the faces of the cutter teeth.

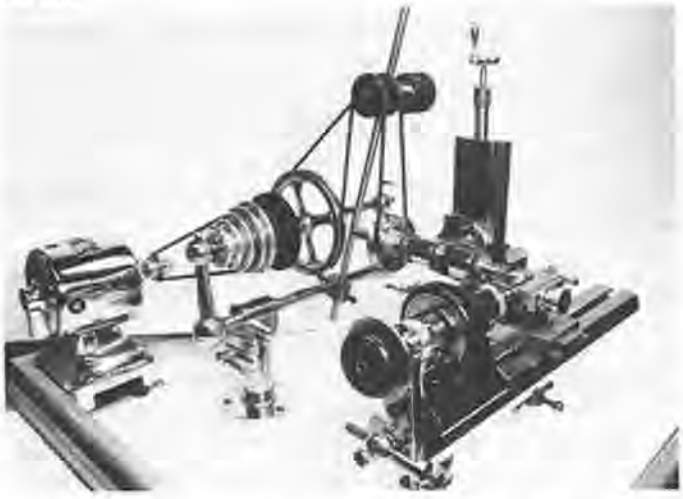
EQUIPMENT USED IN MAKING GEARS

To cut wheels and pinions for watches, one would need the equipment that is shown in Figure 2. In addition to the lathe and motor, one would need a slide rest, a gear cutting attachment (mounted on top of the slide rest), a countershaft to drive the gear cutting attachment, an idler stand to guide the belt to the gear cutting attachment, and a method of indexing the headstock of the lathe. In this illustration, the indexing system is an index plate and index latch. This is considered a simple method of indexing.

Figure 3 shows a close-up view of the gear cutting attachment set in a horizontal position. This is the position that the attachment is usually set in for wheel and pinion cutting. This is mainly because a better view of the work is obtained. When the gear cutting attachment is set in this position, it makes it necessary to place the slide rest on the lathe bed from the back of the bed and to swivel the top slides around 180 degrees as shown in Figures 2 and 3. When the gear cutting attachment is in this position, bevel gears cannot be cut. Also, this position is not the best for cutting contrate wheels.

Figure 4 shows the gear cutting attachment set on the slide rest in a vertical position. When the gear cutting attach-

Figure 2



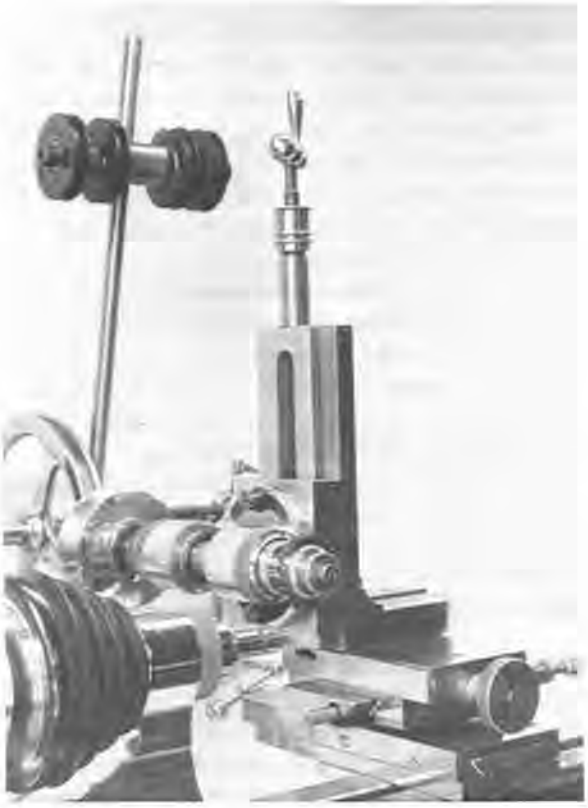


Figure 3

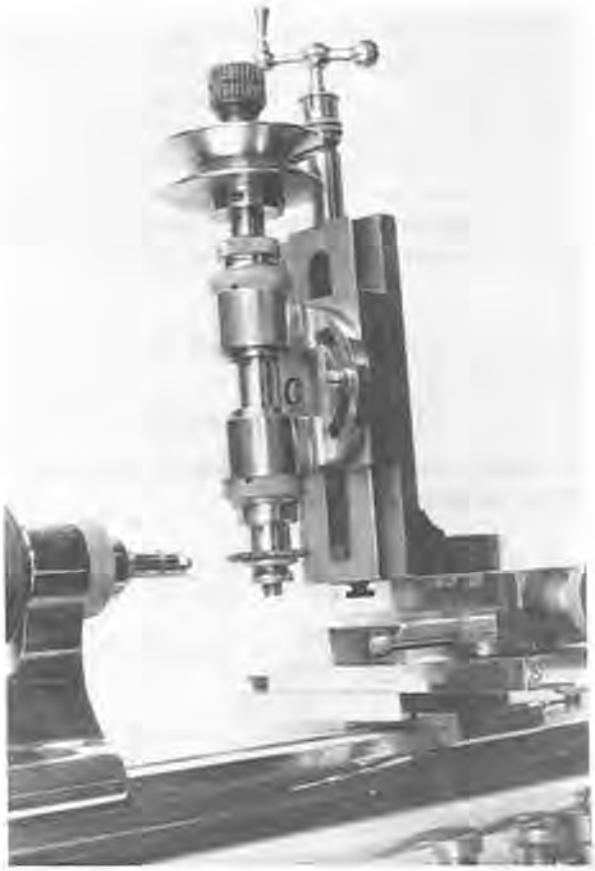


Figure 4

ment is in this position, one can cut regular wheels and pinions as well as bevel gears and contrate wheels, but it is very difficult to view the work and see what the cutter is doing. When the gear cutting attachment is set in the vertical position, there is no need to swivel the top slides of the slide rest 180 degrees and the slide rest goes onto the lathe from the front of the bed.

Figures 5 and 6 show the second and more complicated method of indexing. The indexing attachment fits the headstock of the lathe and is called the universal dividing attachment. This attachment consists of a worm gear mounted on the spindle of the lathe which is driven by a worm that is mounted on a special adjustable plate that allows the worm to be connected and disconnected from the worm gear. The attachment in Figure 5 (which was discussed previously) has a 40 tooth worm gear and a single thread worm driving the worm gear. This gives a ratio of 40 to 1.

The universal dividing attachment that is shown in Figure 6 has a ratio of 80 to 1. The worm gear has 80 teeth and is driven by a single thread worm. This attachment is more accurate than the one shown in Figure 5. When using the 80 to 1 ratio attachment, the number of divisions needed is divided into 80. For example, if we need to cut a gear which has 60 teeth, then we would have: $\frac{80}{60}$.

When these two figures are reduced to their lowest terms, we would have $\frac{4}{3}$.

Now, if we multiply 3 x (5), we would get 15 for the index plate, and if we multiply 4 x (5), we would get 20 which would be the number of holes indexed for each tooth of the wheel being cut. Since 20 is 5 more holes than the index plate has, we would turn the index crank one turn plus 5 holes each time we index for the 60 tooth gear. There are other index plates that could be used to index for the 60 tooth gear. For example:

$$\frac{4 \times (6)}{3 \times (6)} = \frac{24}{18} \text{ or } \frac{4 \times (7)}{3 \times (7)} = \frac{28}{21} \text{ or } \frac{4 \times (9)}{3 \times (9)} = \frac{36}{27} \text{ or}$$

$$\frac{4 \times (11)}{3 \times (11)} = \frac{44}{33} \text{ or } \frac{4 \times (13)}{3 \times (13)} = \frac{52}{39}$$

The bottom number is the index plate and the top number is the number of holes indexed.

There are some numbers that connot be indexed with these attachments and the standard set of plates. For example, one cannot index many of the odd numbers above 50 and some of the even numbers above 50. The even number 96 cannot be indexed with this attachment nor can the following even numbers be indexed: 106, 114, 118, 122, 126, 134, 138 and many other higher even numbers. In order to index these numbers, one would need change gears connecting to the worm and worm gear like a machinist's dividing head is equipped. The only alternatives the watchmaker has are to have a machinist make the individual index plates for the numbers that cannot be made with the universal dividing attachment or make up a knurling tool to form the notches on the odd index plates.

Figure 7 shows this process. View B shows the knurling tool and holder that must be made up for forming the notches on the edge of the index plates. View A shows how the knurling tool is held in the tool post of the slide rest while the notches are formed in the edge of an index plate.

Figure 5

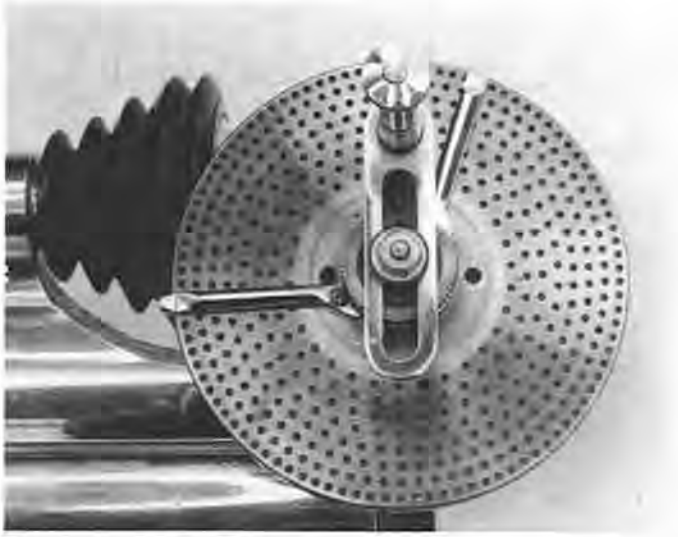


Figure 6

The index plate blank is held on an arbor chuck in the lathe headstock spindle. The knurling roller should be made with 20 or more teeth. The teeth are milled on the roller with a 60 degree milling cutter similar to cutting a pinion. The ends of the teeth must be left sharp so they will cut into the edge of the blank disc when forming the index plate. After the teeth are milled on the roller, the roller is chucked up true and the center hole is bored true with the outside edges of the teeth. Then the roller is hardened and tempered to a medium straw color. Next, the holder is made for the roller. The roller is mounted in the holder on a hardened steel pin. The holder should fit closely in the tool post of the slide rest.

The roller that is shown in View B, Figure 7 has 30 teeth and a diameter of 12 mm. To find the module value of the roller, one would divide the diameter of the roller by its number of teeth or

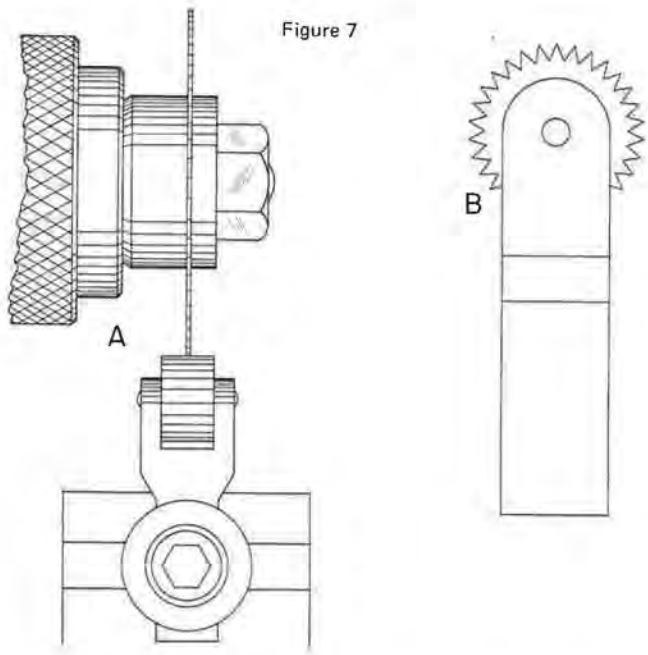
$$m = \frac{12.00 \text{ mm}}{30} = .40 \text{ mm.}$$

To find the diameter of the blank disc for a given number of notches, one would multiply the module (.40) by the number of notches needed in the index plate. For example (96 notches needed): .40 x 96 = 38.40.

The index plates should be made from 1/32 inch sheet brass. The arbor chuck that the blank is fitted onto for forming the notches should fit very closely in the hole in the blank. The hole in the blank should be smaller than the spindle of the lathe that the index is to fit onto. To form the notches, one would first fit the blank true on the arbor chuck. Then, the blank is turned down to diameter. Note: The blank is left slightly oversized at the beginning. The center of the roller should be set the same height as the lathe center. After this, the roller is brought very lightly against the edge of the disc. Then the disc is turned exactly one complete turn to see if the last mark on the edge of the blank matches up with the first mark. If they do match up exactly, then the marks are counted to make sure they are the correct number.

If the number of marks is correct, then proceed to roll the notches deeper by turning the lathe headstock by hand and, at the same time, the roller is fed deeper into the

Figure 7



edge of the blank. The depth of the notches should be about .40 mm.

After the notches have been formed, a graver is used to remove the bur from the edge of the plate. Note: The reason for leaving the blank oversized at first is because it is difficult to measure exactly and to prevent the blank from being undersized. If the blank is the smallest amount undersize, it will be too small which will mean that the first and last mark will not line up or we would have one notch less than is needed on the plate. If the notches turn out being too many, then the blank is reduced slightly and the roller marks are made again. This is repeated until the marks match and are the correct number. Since the diameter of the disc is in proportion to the number of notches made on its edge, few notches mean a small disc; therefore, it is not recommended

(Please turn to page 45)

Pickle Barrel

Marshall F. Richmond, CMW

STANDARD SIZES AND SHAPES OF STONES

In practicing jewelry crafting and repair new problems seem to show up even after many years of experience. After working at this for many years I have stored up some knowledge that I would like to pass on. I realize that if this information were available to me years ago, many difficult jobs could have been made easier. One of the most baffling problems that has plagued me has been repairing stone set rings and jewelry. What are standard sizes? What are standard shapes? What are standard cuts of stones? We will discuss these questions in this article.

Figure 1 shows the following cuts of stone: oval, antique oval, emerald, rectangular or cushion, pear, and marquise or navette. Not shown are square and round Figure 2 shows the various cuts and the sizes that are available. These charts are not a full coverage of sizes and shapes available because some stones are available in stock sizes larger or smaller than the charts will list.

It is important to know as much as possible about the sizes and shapes of stones when doing stone set jewelry replacement or repair. Round stones in many colored stones are available from stock in sizes from 1 mm to 6 mm, and some are listed available to 10 mm by ½ mm sizes. Synthetic or simulated birthstones are all listed as available from 1 mm to 10 mm by ½ mm sizes. Most of these simulated stones are uniformly cut so they can be interchanged without changing the setting, because the width, depth, thickness, and thickness of the girdle are usually very close. In genuine stones, even though they are listed by mm sizes and half mm sizes, they may vary greatly in diameter, thickness, and thickness of girdle. So when ordering genuine stones for a single stone replacement, it is wise to request a memo selection. Usually with this a suitable replacement stone can be found even to a reasonable color match.

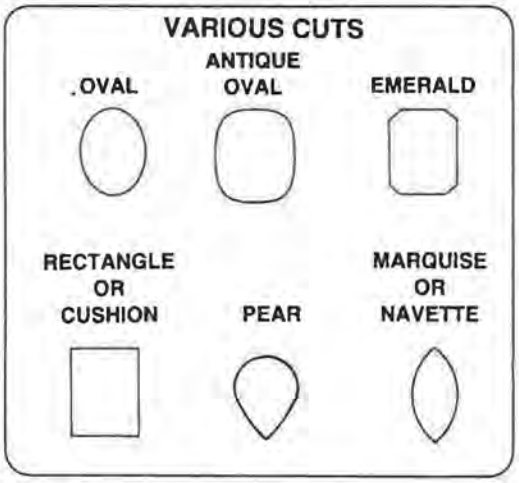


Figure 1. Various stone cuts.

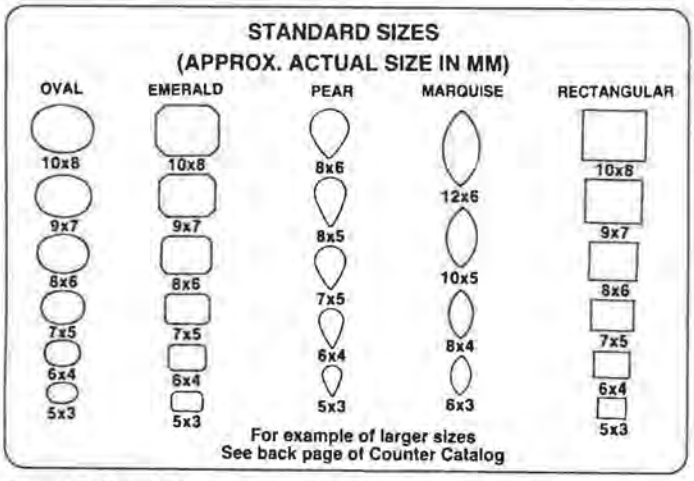


Figure 2. Standard stone sizes. The pictures are reduced sizes shown to indicate the sizes that are available for the shapes.

ROUND STONE SIZE COMPARISON TABLE

SIEVE (PLATE) SIZE	WEIGHT (IN DIAMOND)	MILLIMETER SIZE
2	.005 ct.	1.15 mm
2		1.25 mm
3	.01 ct.	1.35 mm
4		1.45 mm
5	.02 ct.	1.55 mm
6		1.70 mm
7	.03 ct.	1.90 mm
8	.04 ct.	2.10 mm
9	.05 ct.	2.30 mm
10		2.50 mm
11	.06 ct.	2.70 mm
12	.07 ct.	2.90 mm
13	.10 ct.	3.10 mm
14	.12 ct.	3.30 mm
15	.15 ct.	3.50 mm
16	.18 ct.	3.70 mm
17	.21 ct.	3.90 mm
18	.23 ct.	4.10 mm
19	.27 ct.	4.30 mm
20	.33 ct.	4.50 mm
24	.50 ct.	5.13 mm
28	.75 ct.	5.88 mm
31	1.00 ct.	6.45 mm
33	1.25 ct.	6.90 mm
35	1.50 ct.	7.40 mm
39	2.00 ct.	8.20 mm
—	2.50 ct.	9.00 mm
—	3.00 ct.	9.50 mm
—	4.00 ct.	10.00 mm
—	5.00 ct.	11.00 mm

Figure 3

While on the subject of round stones, it may be well to mention round cut diamonds. Today's modern cut diamonds are full cut if larger than 2/100 melee. I will refer to melee diamonds in points for size, as a single point is 1/100 carat, and a ½ point is 1/200 carat. Melee diamonds are available in ½ point, ¾ point, 1 point, 1½ points, 2 points, and 3 points. Larger stones are not necessarily considered melee. Although today's diamonds are proportionately well cut, they can be found in almost any diameter size. Diamonds being sold by carat weight can vary in diameter and still weigh the same by the cuts being made, creating a thicker or thinner diamond. A packet of 100 single point stones should weigh one carat, but the stones could vary anywhere between 1.25 and 1.45 mm in diameter, even though the comparison table from carats to millimeters shows a single point stone to be 1.35 mm in diameter. In making replacements for missing melee stones, it is well to have a fair selection of melee diamonds, for if one the exact size can be found it saves having to alter the setting to be able to set it securely.

Cabochon cut stones are any shape stones that have a surface above the girdle which is domed and smooth. Some ovals and rounds have a high dome, and with milky or clouded appearance will reflect light, creating a six-pointed star. Synthetic star stones are available in many colors and in rounds from 3 mm to 9 mm in diameter and in ovals from 5 x 3 mm to 14 x 12 mm.

There are also genuine black star sapphires available in sizes about the same as synthetic stars, in oval and round. There are also genuine star rubies and sapphires, but I'm not sure of their availability. Cabochons are available in black onyx, jade, opal, opal triplet, tigereye quartz, bloodstone, amber, and hematite. Some of these are available only in limited sizes. Black onyx is available in either cabochon or flat top surface, drilled or undrilled, in round sizes from 2 mm to 20 mm, oval, emerald, rectangular, or antique oval. Rounds

Carat Size	Pear Shape	Marquise Shape	Oval Shape	Emerald Shape	Heart Shape
.02 ct					
.03 ct					
.05 ct					
.07 ct					
.10 ct					
.12 ct		2×4 MM			
.15 ct					
.20 ct					
.25 ct	3×5 MM	3×6 MM	3×5 MM	3×5 MM	4×4 MM
.30 ct					
.35 ct					
.40 ct					
.45 ct					
.50 ct	4×6 MM	8×4 MM	6×4 MM	6×4 MM	5×5 MM
.60 ct					
.65 ct					
.75 ct	7×5 MM	9×4.5 MM	7×5 MM	6.5×4.5 MM	6×6 MM
.85 ct					
1.00 ct	8×5 MM	10×5 MM	7.5×5.5 MM	7×5 MM	6.5×6.5 MM
1.25 ct					
1.50 ct	9×6 MM	11×5.5 MM	8.5×6.5 MM	8×6 MM	7×7 MM
2.00 ct	10×7 MM	12×6 MM	9×7 MM	8.5×6.5 MM	8×8 MM
2.50 ct	12×7 MM	13×6.5 MM	9×7.5 MM		8.5×8.5 MM
3.00 ct	12×8 MM	14×7 MM	10×8 MM	9×7 MM	9×9 MM
3.50 ct	13×8 MM	14×7.5 MM	10×8.5 MM		9.5×9.5 MM
4.00 ct	14×8 MM	15×7.5 MM	11×9 MM	10×8 MM	10×10 MM
4.50 ct	14.5×9 MM	16×8 MM	11×9.5 MM		10.5×10.5 MM
5.00 ct	15×9 MM	16×8.5 MM	12×10 MM	11×9 MM	11×11 MM

Figure 4. Fancy shapes millimeter to carat conversion chart.

are not listed as being available drilled, and only the larger sizes of other shapes are listed as being available drilled.

Cameos carved from shell with a lady's head are available in sizes from 8 to 15 mm round and from 6 x 4 mm to 20 x 10 mm oval. In ordering matched cameos make sure to request that they be matched; if for earrings, specify so as to get a right and left figure for a perfectly matched pair of cameo earrings.

Tigereye cameos are available in double or single warrior's head in emerald, oval, and cushion (rectangular) shapes in sizes from 10 x 8 mm to 20 x 15 mm.

Hematite intaglio single warrior head is available in oval, rectangular, or emerald cut shapes from sizes 8 x 6 mm to 20 x 15 mm.

Marcasites are available in round sizes from 1 mm to 2.50 mm by quarter sizes. They have faceted tops and flat backs.

Cultured pearls are available in round from 2 mm to 9 mm by ¼ sizes in half drilled, full drilled, or undrilled.

Half pearls are available in sizes from 1 mm to 3 mm by ¼ sizes. These are flat on the bottom and may vary in height.

Gray cultured pearls (dyed) half drilled are available in 4, 5, and 6 mm sizes.

Black cultured pearls (dyed) are available in sizes 3 mm to 7 mm by half sizes.

When a diamond is missing the size must be determined for a replacement. It can be done in two ways either by measuring the setting for diameter, or if a good stock is available by trial and error using diamonds or other stones to find a fit. If using other than a diamond the stone that fits can easily and accurately be measured to find or order the proper size. Figure 3 shows a round stone comparison table which shows sieve plate numbers and diamond sizes by carat and millimeter diameters. This can be helpful when finding replacement stones. Figure 4 shows a conversion chart for different shapes of diamonds and their carat weights. In ordering diamonds other than rounds it is important to be able to estimate the carat weight of the stone by the size in order to calculate the cost. This information is also necessary when ordering replacement settings.

Colored stone or stones that are not diamond can have the carat weight estimated by using the measurements of the stone and applying the formula applying to the shape that is found in Figure 5. For making appraisals or ordering duplications without removing the stone and weighing it, these formulas will give approximately the carat weight. Figure 6 gives a general guide to handling and treating gemstones. Although this list is far from complete, it does give much information that can even be converted to other stones, such as ruby and sapphire, which are corundum. This same information can be used when handling any synthetic corundum stones. Many other synthetic stones are synthetic spinel and can be handled the same as genuine spinel.

In using the chart in Figure 5 to obtain carat weight for colored stones it is necessary to have the specific gravity of the stone which can be found on the chart in Figure 6.

In determining sizes of stones from an empty setting there are several ways to do it and possibly several tools that can be used. The use of a Vernier caliper or millimeter gauge is probably as good and quick a way as will be found but will rely on the accuracy and ability of the person that is taking the readings. There are other gauges with a series of holes and round extensions for measuring outside diameters of the stone and inside diameter of the setting–and these are also as accurate as the person using them.

The leveridge gauge is probably the most accurate tool for measuring stones in the mountings as it has fingers for inside measurements and outside measurements. It can also get girdle to top table, girdle to culet, and total thickness measurements, all readings on a dial gauge. It is the most accurate way of determining stone weight other than weighing it on a diamond scale.

All this information is good to know. Sometimes it seems almost a necessity. But on the practical side it can also be very time consuming. This is why with most repairs or stone replacement jobs, the Vernier calipers or millimeter gauge can easily help us more quickly and efficiently. As much as I possibly can, I make most of my replacements by just eyeballing the setting and get some stones out using the trial and error method. Usually the first or second stone tried is the correct one. Saving time is making money, so it is best to use the shortest method possible as long as it doesn't lessen the quality of the work produced.

Much of this information can be helpful in making stone replacements or even repairing settings, but knowledge such as this without experience can be dangerous, leading to the damage of stones while applying heat, or in removing or resetting them. Never forget to analyze any job you are about to attempt, especially before applying heat, in which case you must make sure you know the stone will stand it. If you aren't sure, it's wise to remove it.

The primary source for most of this information and the charts come from J. Frank Golden and Associates, Inc. of Morrow, Georgia, with their permission. They are a stone supplier with a tremendous inventory of all kinds of stones, and a catalog that is full of information with complete current prices listed.

Next month we will discuss stone settings.

TLE

APPROXIMATE CARAT WEIGHT FORMULAS FOR COLORED STONES

(all measurements in millimeters; S.G. = specific gravity)

ROUND: diameter × diameter × depth × S.G. × .0018 = weight

OVAL: $\left(\frac{\text{Length + width}}{2}\right) \times \left(\frac{\text{Length + width}}{2}\right) \times \text{depth} \times \text{S.G.} \times .0020 = \text{carat weight}$

EMERALD: Length × width × depth × S.G. × .0025 = carat weight

RECTANGULAR: Length × width × depth × S.G. × .0026 = carat weight

SQUARE: Length × width × depth × S.G. × .0023 = carat weight

MARQUISE: Length × width × depth × S.G. × .0016 = carat weight

PEAR: Length × width × depth × S.G. × .0018 = carat weight

CABOCHON: Length × width × depth × S.G. × .0026 = carat weight

Figure 5

Gemstone Characteristics, General Guide To Handling and Treatments

Gemstone	Ref. Index	Specific Gravity	Optic Char	Hardness Toughness	TYPICAL STONE REACTIONS TO VARIOUS JEWELRY PROCEDURES: Setting	Polishing	Torch	Boiling	Steaming	Ultrasonic	Acid	Treatments
DIAMOND	2.417	3.52±.01	SR	H-10 T-Good	Very Excellent	Good	Good	Excellent	Excellent	Excellent	Excellent	Occasionally laser drilled to improve appearance
AQUAMARINE	1.577 to 1.583	2.67 to 2.84	DR	H-7½-8 T-Fair	Fair	Good	Poor	Poor	Fair	Fair	Good	Often heated to improve color
CHRYSOBERYL (Alexandrite)	1.746 to 1.755	3.73 ±.02	DR	H-8½ T-Good	Very Good	Excellent	Fair	Good	Good	Good	Good	Not currently known to be treated
CORUNDUM (Ruby, Sapphire)	1.762 to 1.770	4.00 ±.03	DR	H-9 T-Good	Very Good	Excellent	R-Good S-Fair	Good	Good	Good	Good	Commonly heated to improve color and appearance
EMERALD	1.577 to 1.583	2.67 to 2.84	DR	H-7½-8 T-Poor	Poor	Fair	Poor	Poor	Poor	Fair	Poor	Commonly oiled to improve appearance
GARNET	1.72 to 1.875	3.30 to 4.18	SR	H-6½-7½ T-Fair	Good to Fair (Flaw)	Good	Poor	Poor	Fair	Good	Poor	Not currently known to be treated.
KUNZITE	1.660 to 1.676	3.18 ±.03	DR	H-6-7 T-Poor	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Not currently known to be treated.
OPAL	1.45	1.25 to 2.22	SR	H-5½-6½ T-Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Not known to be treated. Rarely they are oiled to hide crazing
PERIDOT	1.654 to 1.690	3.31 to 3.48	DR	H-6½-7 T-Poor	Poor	Poor	Poor	Poor	Poor	Fair	Poor	Not currently known to be treated.
QUARTZ (Amethyst, Citrine, Smoky)	1.544 to 1.553	2.66 ±.01	DR or AGG	H-6½-7 T-Good	Good	Good	Fair (Color change poss.)	Fair	Fair	Good	Fair	Sometimes heated to enhance color
SPINEL	1.718	3.57 to 3.90	SR	H-8 T-Fair	Good to Fair	Good	Fair	Fair	Good	Good	Good	Not currently known to be treated.
TANZANITE	1.691 to 1.704	3.30 ±.10	DR	H-6½ T-Poor	Poor	Fair	Poor	Poor	Poor	Poor	Fair	Often heat treated to produce blue color
TOPAZ	1.619 to 1.627	3.53 ±.04	DR	H-8 T-Poor	Poor	Good	Poor	Poor	Poor	Fair	Good	Blue topaz is usually heated. Blue and yellow are sometimes heated/ irradiated to improve color.
TOURMALINE	1.624 to 1.644	3.01 to 3.21	DR	H-7-7½ T-Fair	Fair	Good	Poor	Fair	Fair	Good	Fair	Green/blue commonly heated. Pink, Red, Purple occasionally heated or irradiated to improve color.
ZIRCON	1.810 to 1.984	3.93 to 4.73	DR	H-6-6½ T-Poor	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Brown crystals when heated turn blue, colorless, red under certain conditions

Figure 6

NOTES: 1) Any stone with less than a good reaction requires further consideration before attempting the jewelry procedure indicated.
2) This is a guide; any stone may have individual characteristics, i.e., cleavages, other inclusions, treatments, etc. which will require additional care.
3) We do not recommend the use of heat, steam cleaner or ultrasonic cleaner on any pieces of color stone jewelry.

SELF-WINDING WATCHES

Henry B. Fried, CMW, CMC, FAWI, FBHI, ★ FNAWCC

Girard Perregaux
The Gyromatic
Calibre 211

In the quest for mechanical efficiency combined with simplicity and ease of servicing the self-winding watch, the Girard Perregaux Caliber 211 presented two novel and noteworthy features. One was in the method of attaching the oscillating weight to its axle-pinion and the other was in the clever design of its reversing transmission wheels. Both will be treated separately.

Many self-winding watches have their oscillating weights attached to the pinion post or axle by screws which may strip or break or become lost. Others are attached by a spring bolt or gib clamp which has to be removed and may fly away, out of the tweezers. The Gyromatic use a clavette or sliding bolt to unite the weight with its pinion. Shown in Figure 1 is the schematic drawing of the entire self-winding mechanism. This may be removed as a unit by removing three screws, two of which are shown at (J), leaving the regular movement ready for servicing. In Figure 1, (A) is the oscillating weight, (B) is the clavette or sliding bolt, (C) is the slotted post of the oscillating weight pinion. This pinion is contained between the automatic bridge (D) and the lower automatic plate (H). Two reversing wheels (K) and the transmission wheel (O) complete the automatic device.

Figure 2 shows details of the oscillating weight assembly and the features of the clavette. As in all the drawings, the same letters relate to the same parts for easier cross-reference. The oscillating weight (A) is groove-slotted to receive the clavette (B). The clavette is shown slid back to release the oscillating weight (A). The clavette need not be removed; it is always ready to perform the locking service.

From this point on, the weight and pinion are attached and solidly secured, acting as one piece. To manipulate the clavette, it is only required to place the tweezers at the rear lip, pushing it in the direction required. It will also be noted that a snap-lock feature of the clavette prongs insures its locking position. Another feature is the sturdy proportions of the oscillating weight pinion which can easily support the oscillating weight yet transmit the most movements to the automatic train.

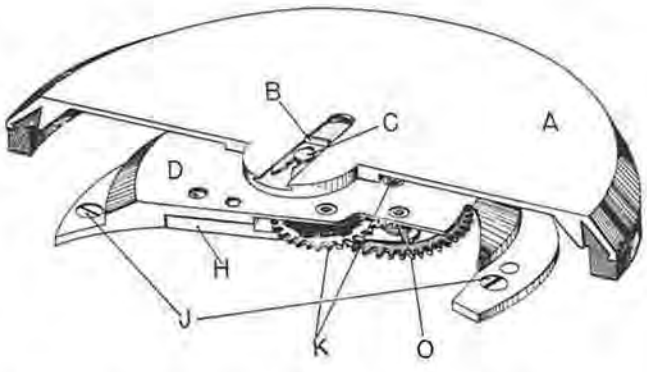


Figure 1. Schematic drawing of the automatic device of the Gyromatic calibre 211. It can be removed as a unit by removing the screws shown at J. K and K are the Gyromatic wheels. B is the clavette, locking device.

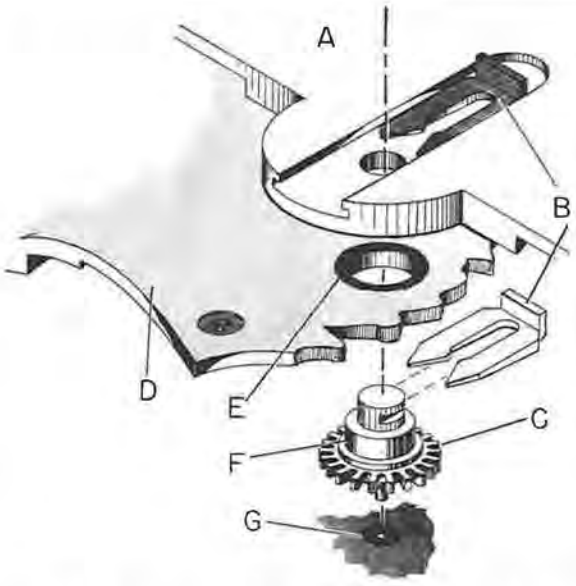


Figure 2. Assembly of the oscillating weight unit and oscillating weight pinion and the locking clavette. Clavette B is merely slid back to release the weight from the pinion C. Pinion C has both its upper and lower bearing surfaces riding in sturdy jewel bearings G and E.

The oscillating weight pinion has a lower pivot which rests in a jeweled bearing (G) set into the lower automatic plate (Figure 1, H). The pinion shoulder (F) fits up through the jeweled bearing (E), which is set into the automatic bridge, (D). The fact that the pinion (C) has both ends turning in sturdy jewel bearings reduces friction and wear and increases the efficiency of the winding sequence. The shoulder of (F) fits up against the bottom of the oscillating weight while the slotted post of the pinion fits up through the hole in the oscillating weight. The clavette (B) is then nudged forward to lock into the grooves of the pinion.

In the design of transmission or reversing wheels for the automatic train, it is often necessary to mount the wheels on their pinions freely so that they may turn independently of them and, sometimes, in opposite directions. When they are required to turn together, some locking device is necessary such as a click. When springs are used to activate these clicks, they have the disadvantage of resisting some of the winding action. Some use self-locking clicks but these take up much space on the wheel and the action may not be uniform.

In the gyromatic, the new clutch-lock device is uniform, positive, has no clicks or clutch and is remarkably smooth in its action. Figures 3 and 4 illustrate its construction and operation. Figure 3 shows an exploded view of the gyro-wheels as they are called. From the bottom upwards, (K) is the gyro-pinion which fits tightly through the lower retaining shoulder-plate (L). The pinion and plate next fit quite loosely into the gyro-wheel (M) which has seven compartments. Into each of these compartments are placed the small disc-rollers (M) which are either hardened and lapped steel or functional jewels. Into each of these compartments is placed one of these small roller discs (M). One is shown in the phantom view in one of the seven compartments while another illustrates how it rests on the edge-shoulder of plate (L).

When the pinion (K), plate (L), wheel (M), and roller discs (N) are in place, the top plate (L-u) is pressed friction tight onto the pinion (K). The rollers (N) rest on the edge-

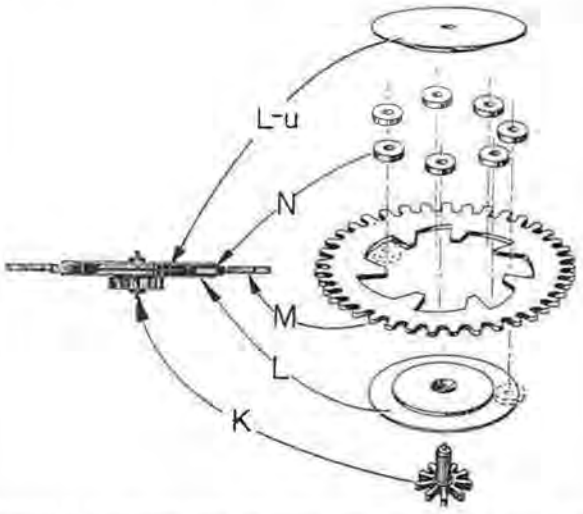


Figure 3. Exploded view showing assembly of the gyro-wheels. Pinion K fits tightly into the shoulder plate L. K-L then fits easily into the space of wheel M. Roller-discs N, which are either lapped, hard-steel or functional jewels, fit compartments of the wheel M, one of which is shown in the phantom view in the compartment and another resting on the shoulder of L. The upper plate L-u fits friction-tight onto the emerging pinion post of K. Assembled, it appears as shown in the figure at the right.

platform of (L) and (L-u). The combined thickness of the shoulders of (L) and (L-u) is slightly more than the thickness of the rollers (N), providing just the right amount of endshake for the rollers between the platforms of (L) and (L-u). Study the side view at the left for the assembled cross section of the gyro-wheels.

Figures 4 and 5 show the entire automatic train and illustrate how the gyro-wheels function. In these figures, the upper retaining plates (L-u) of each of the two wheels have been omitted for clarity. (A) is the oscillating weight. (C) is the oscillating weight pinion, which in this view is turning clockwise and is always (and only) engaged with the gyro-wheel (M-1) at the left. This turns the wheel (M-1) counterclockwise. Gyro-wheel (M-1) is always enmeshed with gyro-wheel (M-2). Both (M-1) and (M-2) are exactly alike in construction. Below them are respectively the pinions (K-1) and (K-2). The transmission wheel (O) is directly geared to both pinions (K-1) and (K-2). The transmission wheel pinion (P) moves the ratchet (R).

Now turn your attention again to wheels (M-1) and (M-2). Notice that the outer edges of each of the seven roller compartments are curved inward. (M-1) is turning counterclockwise. This provides more space for the rollers between the shoulder edge of plate (L-1) and the curved edge of each compartment of wheel (M-1) as shown by the arrow. Thus wheel (M-1) continues to turn free of the pinion (K-1) Notice, however, that this wheel is enmeshed with (M-2), thus causing its mate to turn clockwise. In doing so, the curved edges of its roller compartments crowd each roller so that each of them becomes gripped between the compartments' inner curved edges and the edges of the retaining plate shoulders (L-2). This causes the entire unit (gyro-wheel M-2, L-2, K-2) to act as one. The pinion, turning in the clockwise direction gives the wheel (O) counterclockwise motion. Its pinion (P) then moves the ratchet.

Incidentally, it will be observed that the pinion (K-1) and its wheel (M-1) turn in opposite directions. This is because the wheel (O), geared to both gyro-wheels, will always move the free pinion in the opposite direction from its wheel above. A study of Figures 4 and 5 will make the reasons quite clear.

Figure 5 shows how the winding action operates when the oscillating weight and its pinion (C) turn counterclockwise. In this phase, the action is directly from (C) to (M-1), (K-1), to (P), (O), and (R), the second gyro-wheel operates only when the oscillating weight turns clockwise. Notice that the wheel (M-1), turned clockwise by the oscillating weight pinion (C), moves so that the rollers are gripped in the narrowing space in each compartment. This forces them to act as a solid linkage between the wheel and its pinion (K-1), which in turn operates the wheel (O) and the mainspring ratchet (R). The gyro-wheel (M-2 and K-2) in this phase act only as an idler, each turned in an opposite direction.

In Figures 4 and 5, the click (S) is shown partially pushed aside. The following will explain why the ratchet wheel will not backlash but retain even the most infinitesimal winding action. Suppose the ratchet in the position shown desires to backlash, it will force wheel (O) and pinion (P) in the clockwise direction. Since wheel (O) is geared to *both* (K-1) and (K-2), these pinions will be turned in the counterclockwise direction. Turning with its attached retaining plates will carry the roller-discs towards narrowing, gripping sections of the compartments. This will cause both gyro-wheels to act, each as solid wheels and pinions. Since (M-1) and (M-2) are

now trying to go in the same direction but are geared together, they remain locked. Thus, any degree of winding action is retained. The click (S) is used mainly when the self-winding device is removed and the watch is operated manually.

Should the watch be wound manually, the ratchet will turn the wheel (O) in the counterclockwise action and both pinions (K-1 and K-2) will turn freely in the clockwise direction while both (M-1) and (M-2) remain motionless. It can be seen from the construction of the gyro-wheels that its catching action is instantaneous, efficient, and positive since this action is equally distributed over seven points of contact. Yet its free-rotating phase is remarkably smooth and free, due to the roller action of the discs. The gyro-wheels are assembled at the factory and need never be taken apart or oiled.

A study of an exploded view of the watch movement will give the servicing hints and oiling procedures. Follow these closely and carefully.

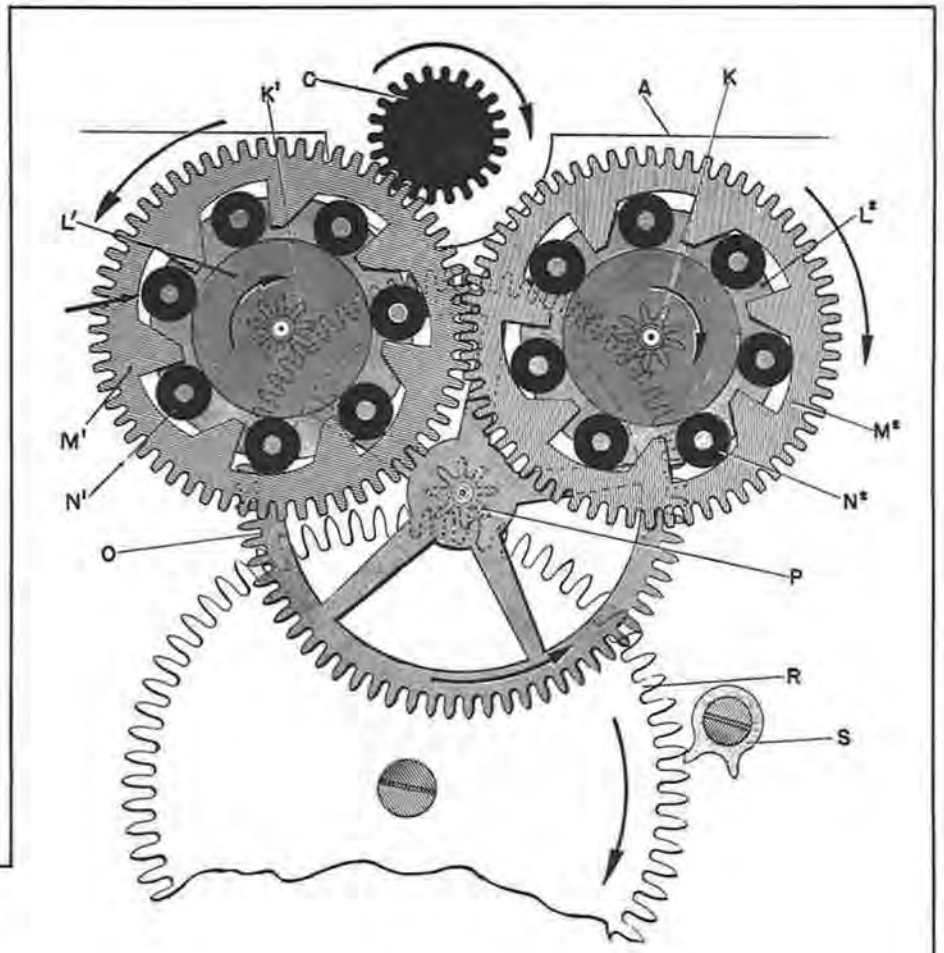


Figure 4 (above right). Entire automatic train, showing the twin gyro-wheels (with plates L-u removed for clarity). Notice that when the pinion C turns clockwise, the wheel M-1 turns opposite and causes the rollers N-1 to move towards the wider parts of their compartments without influencing pinion K-1. However, the gyro-wheel, geared to M-2, is turned clockwise; this crowds the roller discs in the narrowing space, causing the unit to lock with its pinion-plate K-2, which forces the transmission wheel O and its pinion P to activate the mainspring ratchet.

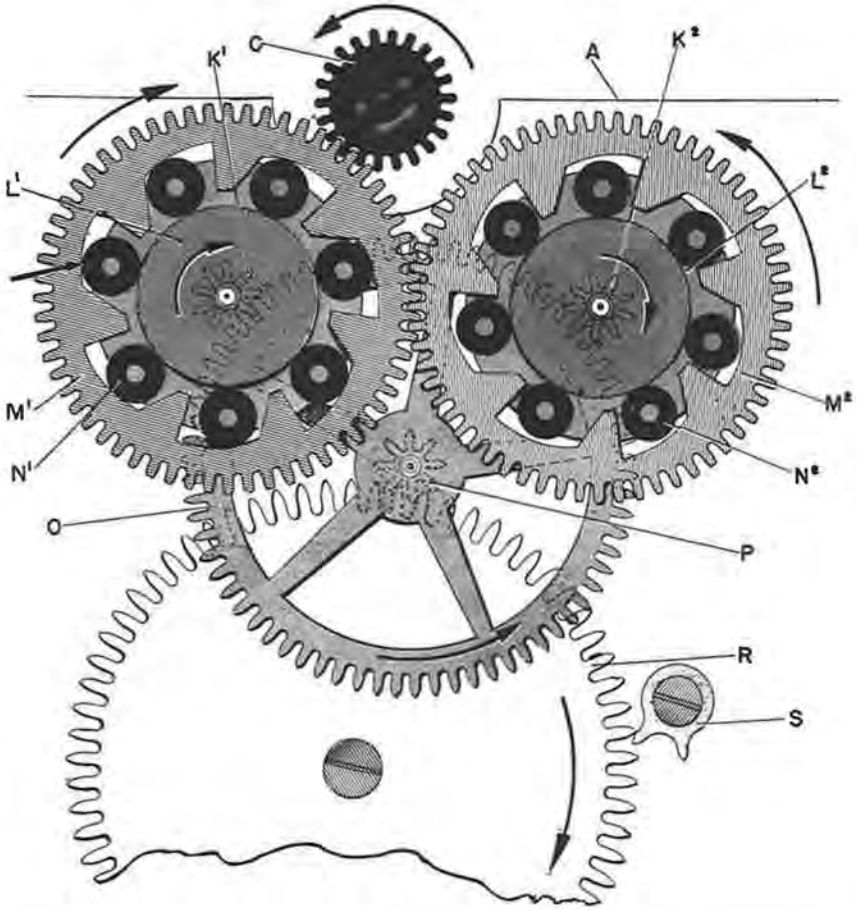


Figure 5 (right). When the oscillating weight pinion C turns counterclockwise, wheel M-1 turns clockwise. This causes roller discs N-1 to move toward the crowded parts of each compartment and locks the entire unit. This makes the pinion and plate K-1 turn with it, moving pinion P of wheel O. The ratchet R is thus activated. In this sequence, the unit of gyro-wheel M-2 acts idling, with the roller discs, N-2, loose in their compartments. Notice that pinion K-2 and wheel M-2 move in opposite directions, as does wheel M-1 during its idling sequence.

HAMBURG AMERIKANISCHE UHRENFABRIK - (HAU)

TWO-TRAIN WESTMINSTER CHIME MOVEMENT

PART IV

By Leo A. Jaroslaw ©1990
Drawings and photos by the author.

Hamburg Amerikanische Uhrenfabrik - (HAU)
Two Train Westminster Chime Movement Clock

In the previous three parts we described (generally) the two-train chimers. We also detailed the operation of the strike control, strike to chime shift, and the chime control systems. In this part we will discuss taking the movement apart and then reassembling, testing, and adjusting it.

DISASSEMBLY OF THE MOVEMENT (Figure 2)

FRONT PLATE:

1. Remove all front plate components except the rack hook lever. I recommend noting the position of all components unless your movement matches my illustrations.

2. Remove the rack hook lever from the chime count detent arbor. This piece must be removed in order to pull

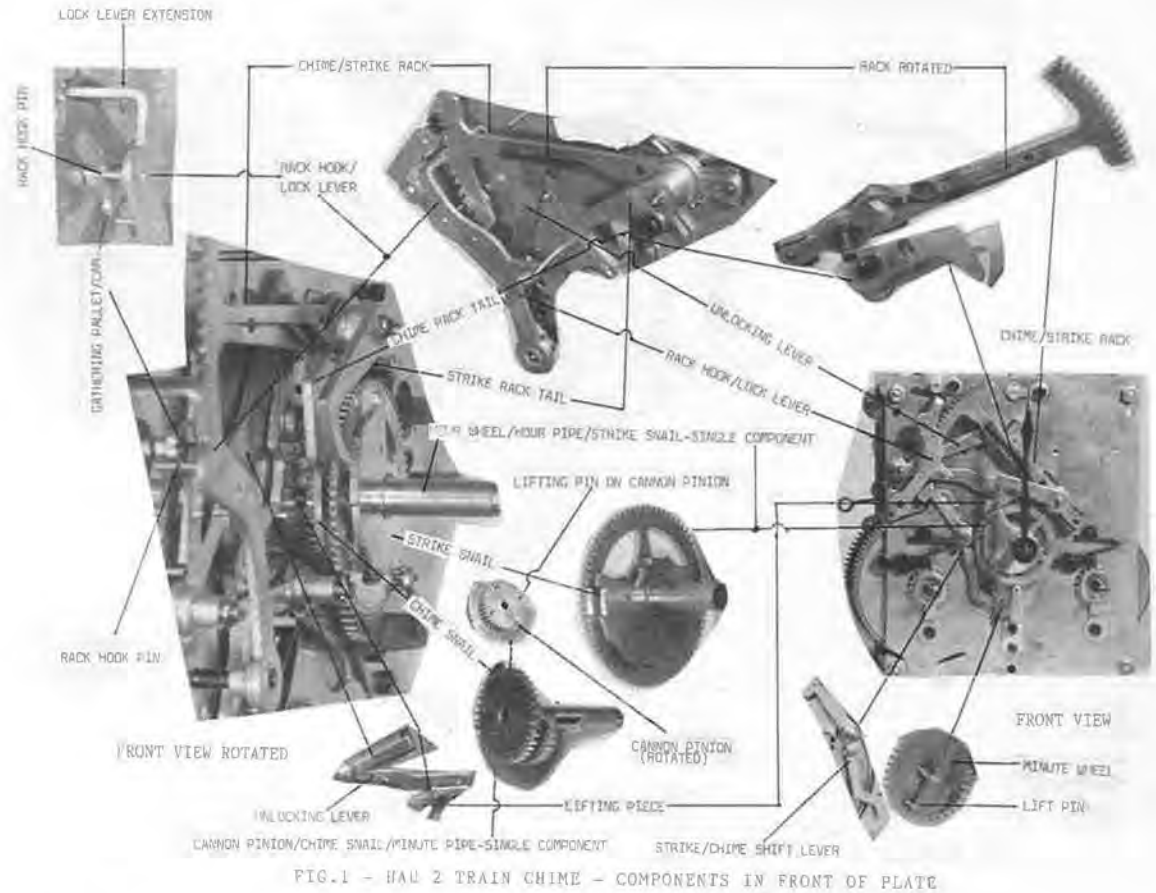


FIG.1 - HAU 2 TRAIN CHIME - COMPONENTS IN FRONT OF PLATE

the front plate. It is pressed onto the arbor; use a gear/large hand puller.

FURTHER DISASSEMBLY

I recommend leaving the shifter mechanism, chime count detent, arbor, as well as the hammer arbor and its attached components on the back plate. Remove them only if repairs are required on any of these items. The trains themselves are fairly standard.

Caution: If removing the shifter mechanism, chime and strike control components, pin barrel and associated hammers, and chains between and in back of the movement plates, note and/or sketch the positions and relationships for reassembly. My photos/sketches in this article can be of assistance. Compare with your actual movement. I worked with only one movement. There may be others which are similar but different.

REASSEMBLY

If the movement has been completely disassembled, assemble between plate trains using normal procedures. Refer to your notes and my figures for reassembly if you have taken apart the shifter mechanism, chime and strike control components, etc.

Upon completion of between plate assembly (or if that was not disassembled), continue with the rear plate components (Figure 4).

Install the strike/chime hammer actuating mechanism. The chains, hammers and bracket can be left till later for handling convenience.

FRONT PLATE COMPONENTS (Figure 1)

Install:

1. Locking lever and lifting piece.
2. Strike/chime shift lever.
3. Cannon pinion/chime snail/minute pipe assembly with minute hand at 12:00. Lift lever should have just dropped off the lifting pin on the bottom of the cannon pinion.
4. Minute wheel so that its lifter pin is at the cam high point on the lower end of the chime/strike shift lever.
5. Hour wheel/strike snail assembly in the one o'clock position.
6. Chime/strike rack assembly. Check that the strike rack tail is on the one o'clock step.
7. Minute wheel cock.

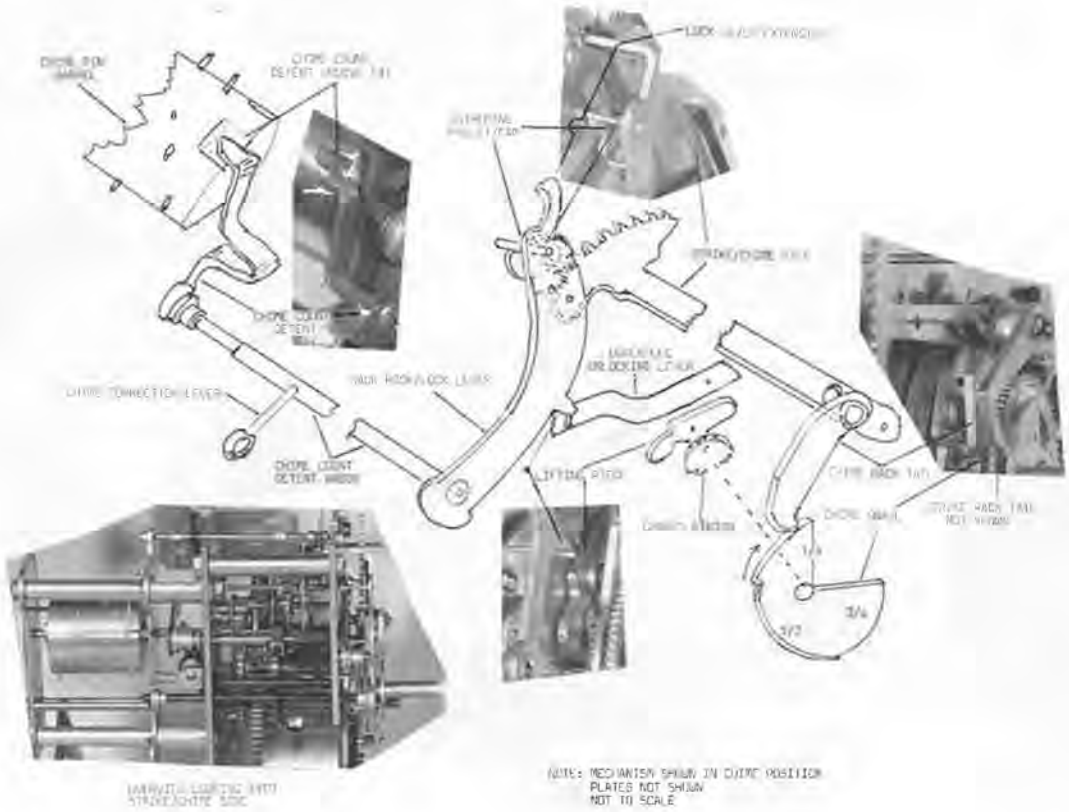
STRIKE CONTROL SYSTEM (Figures 3 & 4)

With the minute wheel lifter pin on the high point of the cam on the strike/chime shift lever, both strike and chime systems should be in the strike mode.

Check:

1. Pin barrel shifted back, in tension, against the shifter spring (center). The stop pin on the other spring should be in a hole in the pin barrel.
2. Open ended lantern pinion free and clear of the strike train second wheel.
3. Chime count detent clear of the pin barrel.
4. Hammer tail assembly aligned with starwheel.

If both systems have not shifted sufficiently, or too much,



adjust by bending the brass shift pin #1. If the shift of the chime system is O.K. but the hammer tail doesn't line up with the starwheel, adjust by loosening the hammer tail clamp screw. Realign with the starwheel and reclamp.

Caution: If the hammer tail assembly is moved, check for proper angle to assure some run after warning before the starwheel starts to lift the tail.

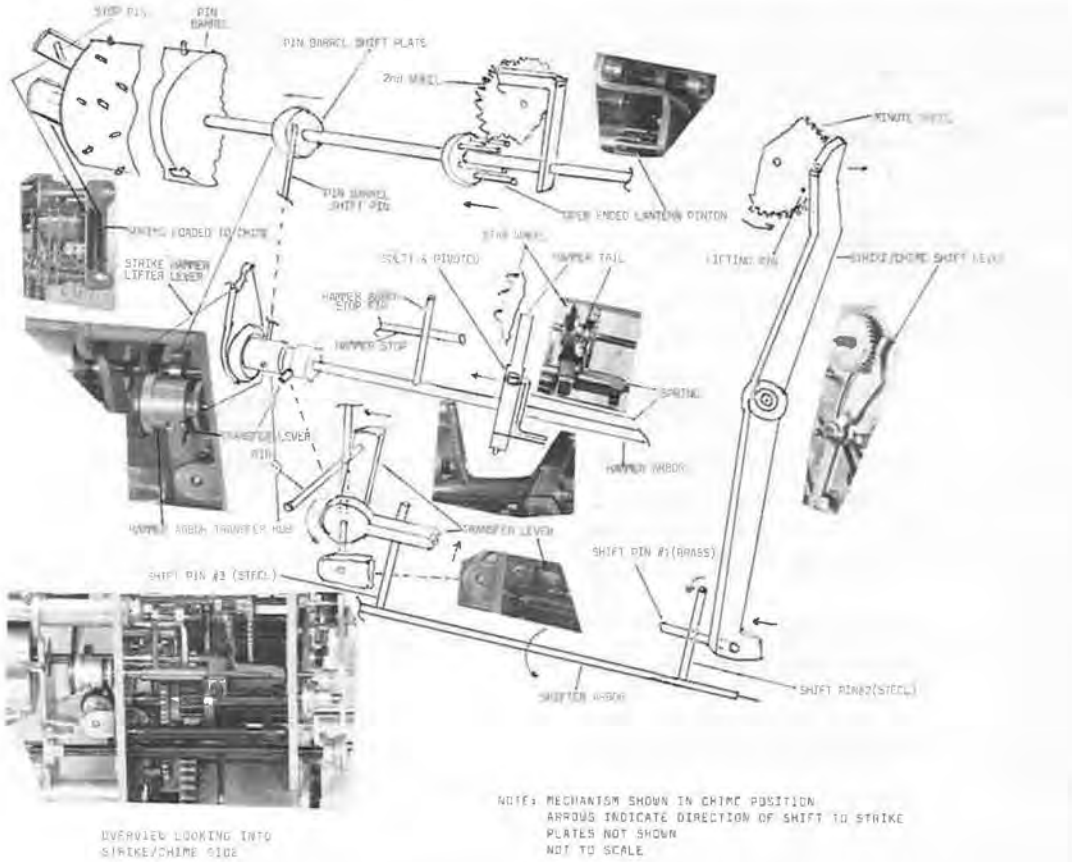


FIG. 3- HAU 2 TRAIN CHIME - SCHEMATIC - STRIKE/CHIME SHIFTER MECHANISM

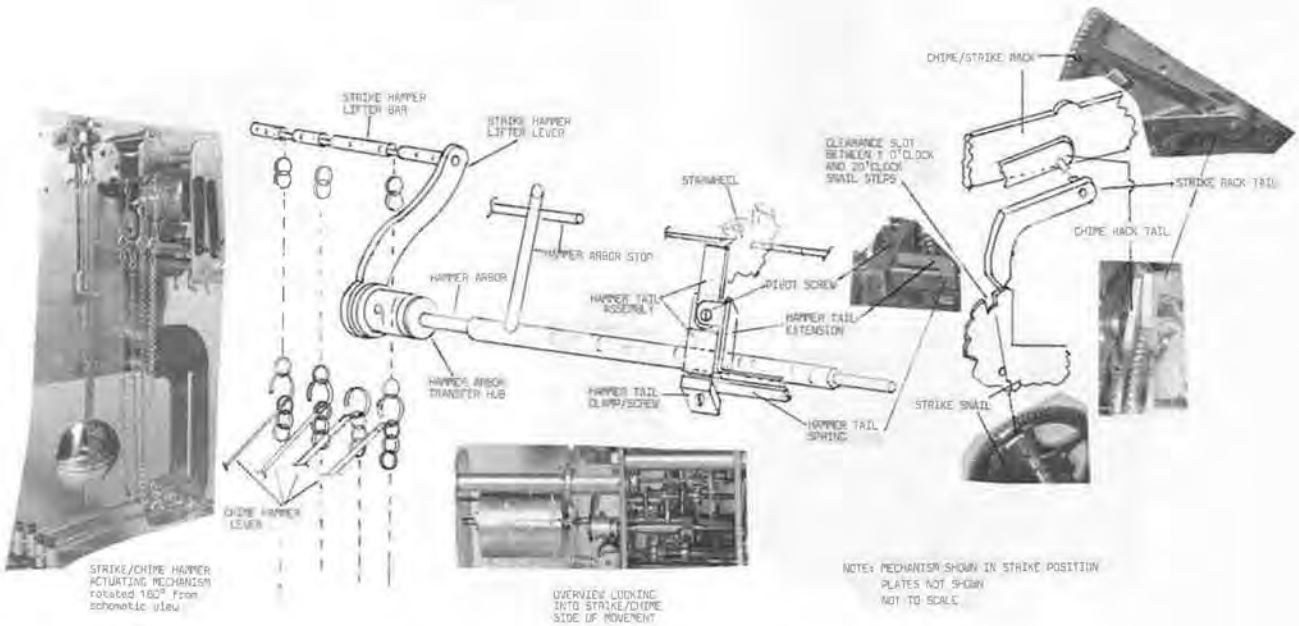


FIG. 4 - HAU 2 TRAIN CHIME - SCHEMATIC - STRIKE CONTROL SYSTEM

CHIME CONTROL SYSTEM (Figure 2)

1. Set the minute hand to quarter past the hour. Observe the shift into the chime mode. Check the engagement of the open-ended lantern pinion with its drive wheel. Check the chime count detent over the pin barrel. Check the hammer tail assembly clear of the starwheel. Check the pins on the pin barrel in alignment with the chime hammer levers.

Check and set or adjust as necessary:

2. Position chime corrector lever out straight.
3. Chime count detent in chime count detent groove in pin barrel.
4. Warning wheel pin up against rack hook/lock lever extension.
5. Install rack hook/lock lever so that the rack hook pin is in the low point on the gathering pallet cam.
6. Reseat the rack hook/lock lever on the chime count detent arbor. Drive it on with the hollow punch.
7. Check operation. If the chime is off and not correcting, recheck the position of the gathering pallet cam when all the above chime mode points are in proper orientation.

CONCLUSION

I hope I have dealt with this clock in enough detail to save you time if you get one similar to repair. It was lots of work but interesting and worth the effort. When you come up against an oddball, why not write it up for the record.

TECHNICALLY WATCHES

(Continued from page 35)

to make plates by this method with fewer than 60 notches. Fewer notches than this make the plate too small in diameter.

One could make a larger roller with a greater pitch and this would make the plate larger with a given number of teeth. This would allow for lower number index plates to be made. It is suggested that when a lower number index plate is needed, that one be made with several times more notches than the one needed. For example, if we need a plate with 10 notches, one should be made with 120 notches. This would mean that each time one would index for 10 divisions, the index latch would be moved 12 notches. A plate with 120 notches can be used to index for the following divisions: 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40 and 60. One could use this method to make large numbered plates to use to make plates with smaller numbers. Note: After a plate has been made, then the outer edge of the plate is chucked true in a bezel chuck while the center hole is bored out to fit the spindle of the lathe on which the plate is to be used.

For further study, see *Horological Times* March and April 1982 issues, "Technically Watches" column.

"Antique Watch Restoration" will continue next month.

AWI REFERRAL SERVICE

Robert L. Macomber
CMC

Mobility aptly describes the current population of the United States. People are retiring earlier and moving to new locales, and businesses are moving their employees all over the country.

Many customers who are moving wish to know of a reliable clockmaker or watchmaker to care for their timekeepers. In moving a clock, for example, proper packing is essential to insure safe arrival and proper setup at the new location. Grampa's heirloom pocket watch which many people are using will need periodic servicing. Who can our customers turn to? How about AWI members?

At the most recent Annual Meeting, your AWI Directors decided to establish a Referral Service which you can offer to your customers. The formation of the Service depends entirely on you, the AWI member. Here's how the Service would work:

1) Each AWI member who wishes to be included should fill out a simple form found on this month's mailing envelope and forward it to AWI Central. The information provided would be name, address, telephone number, specialty, and certification if appropriate.
2) A file by zip code would be established at AWI Central. Upon inclusion in the file, AWI Central will send you confirmation of your participation in the Service. An appropriate counter card advising your customers of the Service will be provided for your shop or store.
3) Upon a request from your customer for a reliable clockmaker or watchmaker, ask for the customer's new zip code. Then you contact AWI Central for a listing of AWI members in the zip code and adjacent zip-coded area.
4) Give this listing to your customer and wish him well. It should be explained to the customer that this listing carries no recommendation but rather signifies that the name is that of an AWI member who has access to the latest technical information necessary to perform reliable service work.

COVENTRY'S LADY GODIVA CLOCK

By

Mary Reed

Photographs printed by kind permission of Coventry City Council, Warks, England.

Coventry, England is well known for its legend of Lady Godiva, who rode naked through the town in order to get its heavy taxes removed by her husband, Earl Leofric. Such was the respect which the townsfolk had for her that all remained indoors with closed shutters, excepting for one Thomas, who, peeping out to see Godiva ride by, gave us the expression "peeping Tom," and, in some versions, was struck blind for his disrespect.

Although many scholars now challenge the story as uncharacteristic of the pious couple, who actually lived in the eleventh century, the legend is recalled by the clock at Broadgate House in the town center. When the hour strikes, Lady Godiva emerges on horseback from behind a door, crosses and disappears behind another door, while Thomas looks out from a triangular window above her.

Though the figures are relatively modern, as will be seen, the clock mechanism has a much older history. Originally it was in the tower of the Coventry Market Hall. The Hall was destroyed by enemy action during the second world war, and although the tower itself survived, a decision was made to demolish it in 1942. The clock mechanism was then stored until a suitable building was erected during the post-war development of the city center.

The decision to commission a clock was taken in 1866, although the possibility had been mooted several years before as a result of the bad timekeeping by local church clocks, according to an article in the June 25, 1926 issue of the *Coventry Standard*. In any event, the clock was ordered from Mr. E.T. Loseby of Leicester, a watchmaker who followed his father's trade first in Coventry, and then in Leicester and London. According to Mr. J.J. Farmer's article, "An account of Mr. E.T. Loseby's improvements in Chronometers, Watches, and Clocks" (*Coventry Herald*, January 18, 1924), its contract was £ 308, 10s, but, due to additional work which the maker provided, its true cost was probably nearer £ 600. It came into service in 1871.

Mr. Loseby himself writes in the January 25, 1889 issue of the *Herald* that:

> *The movements of the large hands are mechanically controlled, without electricity, by a highly finished astronomical clock furnished with a form of mercurial pendulum, which is perfectly compensated for change of temperature; and also with my arc correction, which renders the long and short arcs of vibration isochronous. The minute hand moves over a whole division at once with a sufficiently quick motion to enable the time to be taken to a second from the street. The hour is struck by a hammer which is raised beforehand nearly to the point of falling, and the first blow always strikes the bell four seconds after the minute hand has commenced to move, thus affording two methods by which the time can be accurately ascertained, either by sight or by sound."*

Further details are to be found in the February 8, 1889 issue of the *Herald*, which comments that:

> *". . . The clock is unique in its conception, full of novel detail exciting special interest among those learned in public clocks . . .*
>
> *"The clock is exceptional in having two distinct 'going part trains' with separate driving weight to each. The strain of driving the heavy wheelwork connected with the hands and the 'discharge' of the striking part is thus prevented from disturbing the*

vibration of the pendulum. Owing to the same cause wind disturbance and snow accumulation on the dial and hands are brought to the minimum of effect on the timekeeping, as also are the friction, dirt, rust of the wheelwork within the tower. There is, in fact, incorporated with the heavy work of an ordinary turret clock a complete regulator, made with all the refinements of a high-class observatory clock and on this part the time recording depends. The pallets are jewelled in sapphire, and the pendulum is compensated for temperature by the usual jar of mercury, not, however, in the stirrup form, but by the rod passing through the hermetically-sealed jar . . .

" . . . The clock is fitted with Loseby's isochronising loop, and it is probably the only public clock in the kingdom so controlled . . . Although enclosed in a glass box this slender spring has been made of gold to avoid the possibility of rust in an exposed tower."

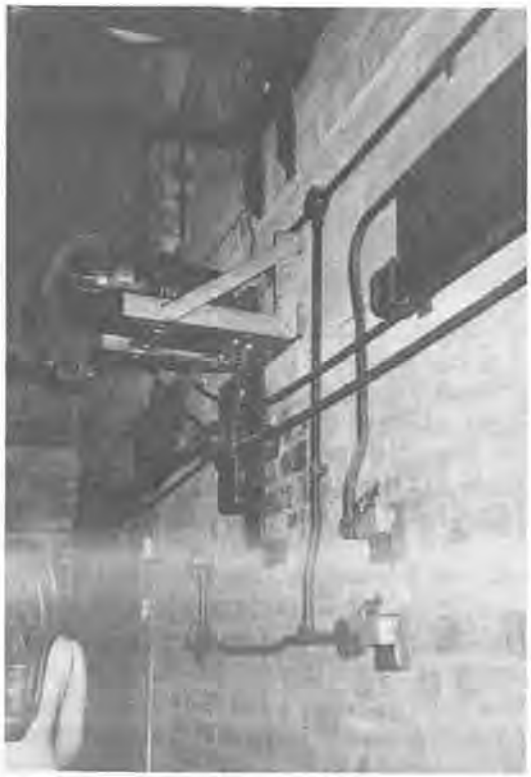
The report goes on to mention that the clock's wheelwork, automatically adjusting to changes in the length of days, turned the gas (which illuminated the dials) up and down accordingly. The gas was also turned down at midnight, and up at 5 AM during the darker time of the year for the benefit of work people passing by.

Mr. Farmer's book, mentioned earlier, provides the following details:

Tower height: 100 feet; weights fall 40 feet.
Clock has four dials, facing the cardinal points.
Dials are 6 feet in diameter, with figures 9½" long and minute dots 1½" long.
Minute hands are 2', 10¼" long; breadth of swell is 5".
Hour hand is 2', 0½" long; breadth of swell is 5¾".
Bell cast by Mears & Stainbank (London); weight: ½ ton; 2 hammers weigh 25 lbs. each striking the bell alternatively, with fall of 5".
Weight driving the striking part is 450 lbs; hand motion weight is 150 lbs.
Small timekeeping clock weighs 10 lbs.; goes 8 days, as does main clock.

Such was the accuracy of this clock that, Mr. Farmer mentions, a clause in Mr. Loseby's contract with the council provided for a fine of £1 for every second's variance over one second a day. Mr. Loseby's letter in the *Herald* of 1889 notes that the clock had been tested against Greenwich time signals and that in the previous year, between January and September on about a dozen dates when it was checked against these signals, the clock's "greatest variation of mean daily rate only amounted to two-tenths of a second throughout the interval." Early in September 1889 he mentions that painters were busy in the upper part of the tower, and before the end of the week the clock's excellent record of timekeeping was broken when it "was found to have been stopped exactly two minutes." It was restarted and continued to keep excellent time until January 9, 1889 when, as Mr. Loseby puts it, "it was found to have been deranged in a way that it could not possibly have got into itself, and which is difficult to account for by anything short of willful intent on the part of some person who has gained access to the clock." He goes on to compare the performance of the clock before then with that of the Westminster clock in London, stating that during the nine months mentioned, "the *greatest* mean daily error of the Market Hall clock . . . amounted to less than one-fifth of the *smallest* mean daily error shown by the Westminster in the same interval; in other words, the smallest errors of the Westminster were five times greater than the largest errors in the Market Hall."

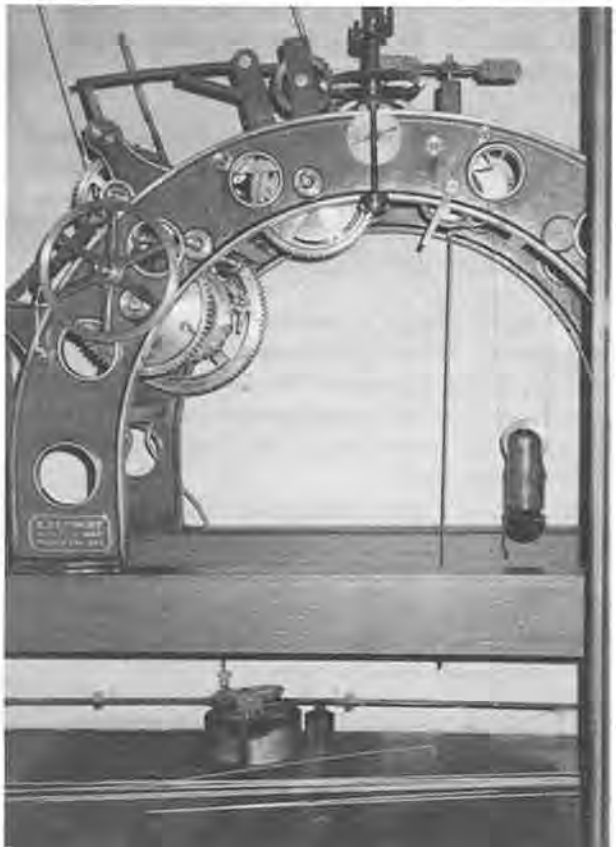
Despite this, however, the following week (February 8, 1889 issue of the *Herald*) the question was raised of possibly checking its accuracy by using a Greenwich time signal. While acknowledging that "A competent observer would have to be employed to watch and publicly record the rate of the clock," the paper considered this "a duty easy of accomplishment," which "together with the time current would be covered by a very moderate annual expenditure." As late as January 18, 1924, the *Herald* was noting that since that time "the clock has fully maintained its splendid accuracy. Mr. S. Corbett, who is in charge of the clock, says its timekeeping does not vary two seconds in three months." Indeed, such was the reputation of the clock for excellent timekeeping that men would settle bets on the accuracy of their watches by it. The report added, rather mysteriously, that two dials each had two bullet holes in them which were " . . . done a long time ago,"



and noted that one of the dials "was cracked in the storm of 1916." Less than 30 years later, the mechanism for this remarkable clock was put into storage until after the war ended.

The clock was, according to "The Broadgate Clock," an article by R. Dent in the Spring 1953 issue of *The Spectrum* (a staff magazine of Coventry Technical College), overhauled after the war by Smiths Clocks Ltd. of Derby. The Technical College was heavily involved with the new clock in that it was responsible for designing the mechanism which runs the figures which appear when the hour strikes. A meeting was held at the college in February 1949, attended by the City Architect, the College Principal (Mr. Trevor Tennant), the sculptor who would make the figures, having been commissioned to do so by the Coventry Planning and Redevelopment Committee, some of the City Architect's staff, and Mr. Dent himself. He writes that, in discussing the matter of the mechanism and figures, after some preliminary ideas had been considered, " . . . the choice finally fell upon that of a four-wheeled carriage running on guide rails. The horse and rider were to be attached to this carriage and carried round the track, being pulled by a chain driven by a sprocket on a motor mounted beneath the track supporting the carriage." Some difficulties were presented because of the curved ends of the track and the spacing of the feet of the horse, so eventually the design was changed somewhat, and " . . . the Principal evolved the present arrangement, which consists essentially of a carriage for the horse and rider, but incorporating also two electric motors, one for driving the carriage and one for animating the horse's feet and simulating riding motion for Lady Godiva." The driving motor's sprocket-wheel engages the middle of a triple chain, thus causing the carriage to be moved along the track as the sprocket revolves.

Mr. Dent continues with a description of the tracks, one at the top and one at the bottom, both made of steel ¼ x 2" in section. Between the tracks are three copper bus bars which supply power to the motors in the carriage; at the



curved ends the track narrows to allow for the support rollers' displacement as the carriage turns. The carriage is made of angle iron. As for moving the figures in the carriage: the shaft of the motor projects up through a plate, with a mitre wheel which drives a second mitre or bevel wheel. The latter is mounted on a cross shaft carrying a chain sprocket which drives the front feet of the horse, and a cam which moves Lady Godiva. The doors open by means of a separate motor which also opens the window from which Tom peeps.

The figures themselves are wooden, and Mr. Dent gives the following approximate measurements:

Horse–4 ft. long, 33" high (53" at head), with shoulder breadth of 10½" and legs 27" long. Weight about 120 lbs.

Lady Godiva–body length 24", width 13", length of legs 22".

Tom–only partially seen; head and shoulders are 43" high, 14" deep, 17" wide, arms 24" long. Weight about 80 lbs.

The disproportionate size of Tom is because of the need to overcome the effects of optical illusion. Tom is mounted on rollers in a way which permits the figure to tilt to look out of the window by means of a crank-type mechanism driven by a motor on the back wall of the clock.

When the hour is struck, a trip switch closes, allowing current to activate the bus bars and the motor which opens the doors and the window. Once open, a rotary switch cuts the current and they remain open as the carriage carrying Lady Godiva comes out of the lefthand door and passes along the front, while the second motor in the carriage animates her and the horse's legs, Tom's motor meanwhile having moved him up to the window. He looks out and covers his eyes as Lady Godiva rides by to disappear through the righthand doors. Then the trip switch cuts the current, the carriage stops out of sight, Tom retreats, and the doors and window are closed. The figures are on view for about seven seconds.

According to notes on the figures in *A Survey of Public Art in Coventry*, published by the Herbert Art Gallery and Museum, the figures were put on display in 1951 and were seen by the King and Queen during a visit to the city in April that year. Public opinion was against the figures, and apparently there were many hostile letters to the press about them. They were installed in July 1953.

The writer first saw the Godiva Clock in the late fifties, by which time public reaction had changed somewhat, and a certain amount of affection had replaced the initial hostility. They are now something of a tourist attraction in a city which was virtually completely rebuilt after the war, and carry on Mr. Loseby's Victorian craftsmanship in a way which he never envisaged when the original clock was described as being "full of novel detail exciting special interest among those learned in public clocks . . . "

SOURCES CONSULTED

Coventry Herald, Jan. 25, 1889; Feb. 8, 1889; Jan. 18, 1924.
Coventry Standard, June 25, 1926.
Godiva and Peeping Tom notes from *A Survey of Public Art in Coventry*, Herbert Art Gallery, Coventry.
The Spectrum, Spring 1953, Coventry Technical College.
Mr. A.J. Mealey, Team Librarian, Coventry City Library.

SCHOLASTICALLY SPEAKING

Jim Lubic

TOO LONG OR NOT LONG ENOUGH

One of the most frequently asked questions put to instructors is: How long is your watch repair, clock repair, or jewelry repair program? If the person asking is a prospective student, the course is always too long; if a prospective employer is asking, the training is not long enough; and if someone who doesn't care one way or the other happens to ask, the response is: "Wow! I didn't think it was that complicated!" How long should the curriculum of a watchmaking program be, and what should it contain?

We have to remember that when a student starts a watchmaking course, he is starting from scratch—unlike the student that takes up auto mechanics who has probably used sockets and wrenches before. The watchmaking student will be using a totally unfamiliar set of tools, and working with parts smaller than he ever imagined.

Let's start the student sawing, filing, and measuring on large projects. As the student improves, he can work on smaller projects, and eventually have a smooth transition into the watchmaker's lathe. Once on the lathe, he/she will learn how to make square shoulders, cone pivots, and maybe even a balance staff properly.

By now the student has learned some patience and craftsmanship, and is ready to work on a watch. Not a ladies' watch, but a large pocket watch. Now the student can take the watch apart piece by piece, and assemble the watch several times, learning the names of the parts at the same time. Then he/she can clean and oil the watch properly, also learning the basics of what makes the watch tick.

From here we can go into men's and ladies' wind-up wristwatches to friction jeweling, restaffing, hairspring work, and escapements. There are still plenty of mechanical watches with day and date features; automatic, chronograph, and stop watches also need repair. What about electronic balance watches and Accutrons? You never know—some day an Accutron might be worth thousands of dollars to a collector, if it works. Then, of course, we have the present-day quartz watches that are here to stay. In order to fix quartz watches one should be able to use a volt/ohmmeter properly.

How long should all this take? Most watch repair courses are one year to eighteen months long, and could easily be made longer. My point is this: students should be exposed to as much as possible, because who knows what types of jobs will come their way in the future? Plus, they want to get out of school and make money. As for the prospective employer's point, there are a lot of things that can only be learned through practical hands-on experience. Most schools have BACs (Business Advisory Councils) made up of local professionals to help keep curriculums up to date. BACs can be very helpful when it comes to any type of change that you, the instructor, may need. From course length to new equipment, the BAC can be a very powerful tool on your side.

As for Joe public that didn't realize how complicated watches are . . . that's something that we as AWI members and the watch manufacturers should work on.

The AWI Movement Bank

*** CONSERVING THE PRESENT ***

*** PROVIDING FOR THE FUTURE ***

The AWI Movement Bank is established for the purpose of providing a reservoir of discontinued parts for use by present and future generation watchmakers. In time the Bank will expand to include clock movements as well.

If desired, a tax credit can be taken for your contribution. If you plan to claim tax credit, indicate the value you place on your donation at the time you sent it; the ELM Trust will acknowledge receipt, and it will be your responsibility to justify that value to the IRS in the event they question you about it.

Your contribution at this time will hasten the day we can begin to service requests for withdrawal from the Bank. Although "Phase I" of the project deals only with watches, donations of watches, clocks, and loose material will be welcome at this time.

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Send your donation to: **AWI/ELM MOVEMENT BANK, AWI CENTRAL, 3700 HARRISON AVE., CINCINNATI, OH 45211.**

AWI's

30TH ANNIVERSARY CELEBRATION

SATURDAY, JUNE 23, 1990
CINCINNATI, OHIO

FEATURING:

GEORGE DANIELS - World Famous British Watchmaker from the Isle of Man.

DANA BLACKWELL - Foremost Clock Expert and Curator of the American Watch & Clock Museum, Bristol, CT.

HENRY B. FRIED - Dean of American Watchmakers and Authority on AWI's Collection including The Packard Watches.

A display and demonstrations will be presented on June 22 & 23. The display will feature handcrafted timepieces from around the world and watches from the famous Packard Collection.

The Saturday evening banquet will enable you to enjoy a top flight speaker and meet some of the horological legends of our time.

A Riverboat Luncheon Cruise will delight the other family members at noon.

For a Program Schedule and Registration Information contact **AWI Central, 3700 Harrison Avenue, Cincinnati, OH 45211.**

HEAR YE! HEAR YE!

In June 1990 we will be celebrating the 30th Anniversary of AWI. We have a program planned with unparallelled guest speakers and exhibits. Our exhibit will consist of handcrafted timepieces and horological tools. We are asking those of you who have created a timepiece—watch, clock, or a special tool—to submit photographs or a description to: **Donald R. Loke, 4 Byram Terrace Dr., Greenwich, CT 06831, or AWI Central.**

We will have a display of early and very rare horological tools. We will present them with a complete description of each tool and in front of each one will be a part that was made by that or similar tool to show what it produced.

BOOK REVIEW

WATCH AND CLOCKMAKERS HANDBOOK, DICTIONARY AND GUIDE by F.J. Britten. 5½x8¾", hard covers, 499 pages, hundreds of good b/w drawings and engravings. Pub. by Antique Collectors' Club @ $29.50.

F.J. Britten was probably the most informative authority of the late 19th and early 20th centuries. The subject of this book ran into fifteen editions between 1881 and 1955. This eleventh edition was first published in 1915, and again in 1976. This is a reprint of that latter printing.

F.J. Britten died in April of 1913. Subsequent editions to this eleventh do not differ materially. During its time, it was considered the encyclopedic bible for both the practicing as well as the academic horologist.

The book is organized as an instructive horological dictionary. Each heading has its English, French, and German equivalent. Acceleration, a phenomenon with newly sprung chronometers, is the first heading and is treated to a page and a half of explanations.

There are hundreds of excellent line drawings or engravings of tools, equipment, astronomical trains, dial details, and various types of balances. Also, there are numerous tables of hairspring types of all kinds, adjusting hints and graphs, balance scales, pendulum tables, formulas and gauges, all explained in detail. Case repairs and the tools required, calendar systems used in watches and clocks, and perpetual calendar systems are included. Virtually every horological term found in this profession used up to its publication date can be found here, and they are explained and illustrated professionally.

Escapements of many kinds are laid out geometrically with the author's comments. Gearing, rations, dial and train wheel counts, pivot polishing, pendulum systems, and master-slave clock systems are shown and explained. Fine engravings of lathes, milling machines, pivot-polishing devices, wheel cutters and how to make them, are within these pages.

Striking and chiming systems, the tourbillon, karrusel, moon trains, and the layout of the "Great Clock at the Houses of Parliament" are shown in a full-page engraving. Numerous tables of wire sizes, gauges, dial and clock trains, pendulum lengths, comparative weights of various metals and their properties, thermoelectric trans-positions, areas of circles, square roots, differences of time from Greenwich to principal cities around the world, equations of time, and a separate dictionary of English, French, and German terms are provided, as is a fine general index.

Henry B. Fried

WATCHES 1850-1980 by M. Cutmore. Hard covers 7½x9½", 239 pages, 151 plates, 17 line drawings. Pub. 1989 by David & Charles @ $65.00.

This is an interesting and important book because it covers watchmaking history from an original and fact-finding point of view. This is a history of the machine-made watch produced in Europe, Great Britain, and America, as well as Japan and Asia. Reading through this volume with its numerous fine photographs one will see watches and movements, especially the English product, which appears to have been influenced by–or in turn, influenced–American watch production.

The book chronicles the advent of the machine-made watch in the various manufacturing countries. It discusses the rise and fall of the American horological industry, the collapse of the English manufacturing attempts, and the Swiss ascendency and decline while the Far East's productive efforts prospered.

An opening chapter by the author recalls the developments of the watch before 1850, starting his account approximately in the early sixteenth century.

By 1850, the lever escapement, an English invention, had reached a fair plateau of development. The Swiss and English used it, although the English still coupled it with the chain and fusee. Furthermore, by this time the complete watch was no longer the product of a single person but rather by a number of specialists. One made plates and bridges or main plates. Another made wheels and pinions; still others were specialists in making dials, hands, cases, chains, and did gilding. Engravers also were employed as decorators or those who placed the assembler or adjuster's name on the completed product. Not mentioned but certainly among the most skilled were the escapement makers and fitters. Thus, Cutmore reminds us that such a practice was already in full force for at least two hundred years prior to the beginning title of this book. Plate 1 in this book is of an English verge "ebauche" or rough movement with uncut fusee and coarse crown (escape) wheel.

By the 1750s, the industry was divided into parts. Rough movements made in Prescott and Lancashire were available to watchmakers in Liverpool, Coventry, Birmingham, and London. Similar operations and Swiss-type ebauches were available in Fontainemelon and Beaucourt. It should be impressed on the reader that these parts still had to be custom-fitted, each to each other to make the whole watch operative.

This book tells of the important methods, equipment, and systems used to sell watches. Salesmen also sold tools, equipment, and spare parts to watchmakers. These salesmen were also sources of trade news, new trade tricks, and, of course, gossip.

Cutmore includes the effects of political upheavals in various countries upon the development of the industry. In another book, *Lantern Clocks*, the effects of various plagues on the clock history also was discussed. Through the years, this too must have had a decided effect of watchmakers as well as hastening migration from one country to another, bringing craftsmen to areas which were comparatively plague-free.

Japy's production of raw movements is quite impressive, even when compared to modern times. By 1805 this manufacturer produced 100,000 pieces a year.

Ingold's entry into the machine-made parts market, an attempt to introduce his precision watch parts manufacturing devices, was without success–despite the superiority of his machines. This, it could be said, accelerated the end of England's supremacy as a producer of fine watches.

The more successful efforts of Leschot are recounted here but this time accepted in his native Switzerland, while Luther Goddard's more traditional methods in America were used to produce over 500 watches using mainly imported parts. Cutmore recalls that it was the Pitkin brothers in America who actually first produced watches with specialized machinery making interchangeable parts in its ill-fated, short

manufacturing career.

A chapter entitled "Developments in America" is a 17-page account of the early Nashua, Wm. Ellery, Howard and Waltham, Elgin, Tremont, Columbus and Peoria ventures.

Other chapters cover further causes for the decline of England's supremacy. Many fine photos of English-made watch movements are pictured. Swiss contemporary activities are fairly reported together with photos of their products which include the revolutionary Roskopf ebauches. The high quality Swiss watches made by Agassiz, Longines, and Omega are also included–some, it is reported, using American horological equipment.

Swiss cheaply-made watches such as the "Enigma" (Tavannes) are also shown. The author considers the modern watch to have evolved around 1880. This date marks a point when the watch factory machines were capable of producing fairly accurate pieces from the chucks, stampings, turnings, and threads. Various types of watches came from these machines. Among some advances were English and Swiss lever watches, and pin lever and duplex escapemented watches. Advances had produced balances, the karrusel, and observatory testing. Complicated watches and the heart cam which allowed a sweep seconds hand to return to zero and create the true chronograph were already there. Case metals, dial making, and printing and engraving devices with jeweling machines also appeared on the scene.

A 52-page chapter on English watchmaking is most informative and gives due credit to Aaron B. Dennison, the Maine-trained father of American watchmaking who finally settled in England to establish the Dennison watch case business, which operated successfully until rather recent times.

Various English-made movements are shown in excellent photographs. Products by Ehrhardt, Rotherham, Nielson, Guye, and others are shown. However, there is a photo which the book reads: "Split plate negative setting Ehrhardt, marked 16 size 1911, Handsworth. The movement has a Swiss escape wheel. It looks American and some may have been for export." This is a 16 size Waltham made for export, most often bearing the name "Home Watch Co."

Prescott and Lancashire watches are shown and their histories recorded. There are tables of chronological developments of some factories and attempts to manufacture an Ingersoll type of calibre. Some examples are shown.

The chapters covering Swiss watches are good with more emphasis given to the more modest-priced calibres, although some high-grade Agassiz, Omega, and Longines are included. Many of the cheaper Swiss are strange to those on this side of the Atlantic. Six-movement styles pictured as not having been identified show one–popular in the U.S. about 50 years ago–as a 6½ lignes Peseux. Although it had a center pinion, the pinion had no center wheel but another train wheel; one of four was driven as well by the barrel.

Cutmore's account of the American watchmaking starts with American attempts to produce a cheap watch, and thus he mentions the Benedict & Burnham, Daniel A.A. Buck, and the Waterbury Rotary with later Ingersoll products. Quality U.S. watches certainly are not overlooked, with examples of Hamilton, Rockford, IL, and Waltham represented, among others.

The chapter "Watchmaking in Other Countries" includes the early horological histories of France, Germany, and even Russia (which country horological historians seemed to have ignored or could not obtain authentic background facts). In the Russian story, the Ansonia, Dueber-Hampden post-WWI ventures are told in a welcomed report of what took place between 1930 and the present. Early Japanese watches are pictured, mainly from the Seiko plants. The Japanese beginnings give due credit to the American influence in the early 20th century. Hong Kong, China, and Eastern Europe's horological products are briefly mentioned.

A chapter on "Manufacturing Principles" shows some 19th century American lathes and automatic machinery. Swiss screw cutting lathes are pictured with good accompanying texts. Modern multi-headed milling machines are shown as well, alongside photos of old Swiss assembly and manufacturing stations.

A good bibliography is given except that the only American book, *American Watchmaking* by Harrold, is listed. There are five pages of references which allude to smaller type numbers in the text. These are worthwhile. Of the many names the author acknowledges as being helpful, only one American is mentioned–again, Mr. Harrold.

In this entire book is a serious and important effort, and it adds much to the current store of horological facts and history.

Henry B. Fried

AWI
MATERIAL SEARCH NETWORK

EDITOR'S NOTE: This column is designed to work in conjunction with the AWI Movement Bank. (Details are on page 4 of the October 1989 issue.) 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.

AWI Material Search Network Needs
As of December 13, 1989:

Item 3A: A complete movement for Elgin calibre 965 (AS1748)–auto/date/ss hand.

Item 3C: Gruen UUT (Ultra Ultra Thin) balance wheel and staff. Identified in Gruen parts catalog as part #5412.

Item 4C: Proper replacement spring for Seth Thomas Sonora Chime movement. The spring has a hole end and measures 1" x .56 mm x 120".

Item 1D: Swiss mechanical movement 5¼ x 8½ ligne, 17 mm round dial if available to fit. Prefer one of the following movements but will accept any others of this size: Unitas basic calibre 520 or Peseux basic calibre 100. A good used movement that can be serviced will be welcome if a new one is not available.

IF YOU CAN SUPPLY ANY OF THESE ITEMS, PLEASE CONTACT: *Material Search Network, AWI Central, P.O. Box 11011, Cincinnati, Ohio 45211.*

Affiliate Chapter Column

Paul D. Wadsworth

January 1990

I hope that everyone had a great Holiday Season. With the rush over now, things should settle down to an even pace so that we can plan that trip to Cincinnati in five months. Yes, just five months from now we'll be starting out for one more AWI annual meeting. I just received a letter that the dates of the meeting might be changed to June 29, 30, and July 1st, 1990. This will change my plans and allow us to go to the NAWCC annual meeting in New Orleans the following week. As I've said before, we try to plan some side trips each year along with the trip to AWI's annual meeting. New Orleans sounds like a great place to visit. Too bad we don't have more time . . . we could take a raft from Cincinnati down the river just like Huck Finn did many years ago.

Our state association had a board meeting a couple of weeks ago, and one of the members mentioned that he had been in the area of Cincinnati and dropped in to the office for a visit. He reports that all were busy working but they found time to discuss an idea about membership. It was suggested that perhaps AWI should require all members of the affiliated chapters to be members of AWI. In order to belong to the local guild, one would first need to belong to AWI, then join the local guild. This is how some other organizations have operated, and they seem to have had a very good response to this mode of operation. What do you think? Would this increase the membership of the guilds, or AWI, or both/neither? Let's hear from some of the people out there that have had experience with membership campaigns. This might be a good proposal for the annual meeting.

This is the time to be starting to formulate your recommendations for the annual meeting. Every year I ask the members of our state what they want me to bring to the AWI board meeting. And every year I get the same response—no answers. Could it be that the AWI board and office are so very responsive to every detail and question asked of them that no one can think of anything that should be changed? Let's all pose this question to our memberships and find out what they want done differently. This way you can bring ideas from the members and at least be able to do your job as representative for the wishes of the members.

By the time that you read this, the board will have met for their mid-year update and should be well on their way to finalizing the plans for the big 30th annual meeting in June. It sure would be nice to have a representative there from each of the 38 affiliated chapters. How about a letter from anyone that can't make it? That way, at least we could appoint a proxy to read the response to the questionnaire and letter, and we could have full representation at least in thought and ideas.

The letters have been few and far between this month. Actually, they have been so far between that I must have missed out on any that went by. Perhaps I was looking the other way or maybe even dozed off. I would assume that the henscratching I have been sending in must be what you want to see, or perhaps it boils down to the fact that watchmakers don't read anyway. So far on the list of museums I have a total of four. I sure could use some more input on them if we are to compose a list that could be used for trips, etc.

ASSOCIATION NEWS

ARIZONA

The Arizona Clockmakers & Watchmakers Guild held a dinner meeting on November 21, 1989. Guests Jim Lindon and Bob Ivan were introduced as potential members. Also welcomed was Alice Anderson, a guest.

Members were advised of the Introduction to the Watchmakers Lathe bench course to be held in Phoenix on September 15-16, 1990. Reservations were made for eight members from Arizona which fills the course capacity.

The program was a presentation by Dr. Joseph G. Baier on "Shop and Tools of Horology." Dr. Baier showed slides and gave explanations of the "preacher" used for locating pivot holes, modified pliers for various special jobs, use of the rolling mill for duplicating old-style pendulum rods, and suspension springs. Also covered were the use of index plates for gear cutting and lantern pinion repair and manufacture, use of the drill press for rebushing, and using the lathe and centering drills for repivoting. Dr. Baier also showed before and after slide photos of a Seth Thomas wooden works which he had restored for the AWI Museum. He also showed views of the two Packard watches which he restored for AWI. These watches were recently sold by AWI with the proceeds being used for the AWI Perpetuation Fund.

MARYLAND

The Horological Association of Maryland held their regular membership meeting on October 16, 1989. There were 29 members in attendance with two guests from Watch & Casemakers, Ltd., of Highland Park, NJ.

Jerry Kincaid reported on the October 15th ESA 255 Quartz Watch Repair Seminar held in Ellicott City. Dan Fenwick of the Swiss Watch Technical Center, Lancaster, PA, conducted the hands-on workshop. They worked mainly on the special features–calendar, moonphase, day-date, and other dial combinations.

Philip Poniz of Watch and Casemakers, Ltd. was guest speaker. He told what services his company offered to the watchmaker and a short history of his company. Now added to the casemaking, part making, and servicing, the company now offers hairspring vibrating. They will make parts for any watch. Mr. Poniz demonstrated the hairspring vibrating techniques used in his shop. He is developing newer and more scientific methods in the vibrating field.

MINNESOTA

On October 7 and 8, 1989, the Minnesota Watch & Clockmakers Association, in conjunction with AWI, held two seminars at the Western Inn at Owatonna, MN. The first of these was a two-day seminar on the Repair of the Atmos Clock by Gerald Jaeger. Those attending said it was very good and totally complete. For any person considering repairing the Atmos clock, this course is a must. The Atmos course takes two days to complete because of the complexity of the clock. Without the proper tools and knowledge, it can be very difficult to repair.

UPCOMING EVENTS

The Horological Association of Virginia
and
The Virginia Jewelers Association
Annual Convenion
April 6-8, 1990
Embassey Suites – Richmond, VA

Missouri Jewelers & Watchmakers Association
Annual Convention
April 27-29. 1990
Holiday Inn – Lake Ozark, MO

Arizona Clockmakers & Watchmakers Guild
Annual Convention
May 19-20, 1990
Scottsdale, AZ

Kansas Jewelers Association Annual Convention
June 1-3, 1990
Holiday Inn – Olathe, KS

North Carolina Watchmakers Association
Annual Convention
June 1-3, 1990
Holiday Inn North – Raleigh, NC

Nebraska & South Dakota Jewelers Association
85th Annual Convention
August 17-19, 1990
Kearney Ramada Inn – Kearney, NE

The second seminar was Retrofitting and Casing by James Broughton. He introduced the latest products available for retrofitting and demonstrated many helpful procedures and shortcuts. He also touched base on coil repair, troubleshooting of coils, and circuit boards.

NORTH CAROLINA

On September 10, 1989, the Triangle Guild of the North Carolina Watchmakers Association held their annual family fish fry with 50 persons attending. Several members from the Cape Fear and Coastal Plains Guilds were also present.

The Coastal Plains Guild met on October 8, 1989. After the business portion of the meeting the topic was irradiated stones. An article was distributed and each person gave his experience or knowledge of irradiated stones. It was a very creative meeting.

The North Carolina Watchmakers Association will hold their annual convention on June 1, 2 and 3, 1990 at the Holiday Inn North in Raleigh, NC. For more information contact Alice Carpenter at (919) 823-2944.

News in the Trade

KASSOY OFFERS MIRROR GLASS BUILDUPS

Tasteful and appealing high fashion building block displayers from Kassoy allow the retailer to create exciting jewelry presentations. Mirror glass, on tops and sides, add drama and dimension to showing bracelets, rings, chains, pearls, etc., and are perfect for windows and showcases. Pieces can be purchased separately, but the full set maximizes the effect and builds traffic-stoppers. Prices range from $6.55 to $12.65 each; code numbers are DIS605 through DIS615.

For more information contact: **Kassoy, 16 Midland Ave., Hicksville, NY 11801; (800) 4-KASSOY; in NY state call (516) 942-0560.**

Kassoy

NEW OAK SCHOOLHOUSE CLOCK FROM SEIKO

Seiko has designed its newest schoolhouse favorite in a solid oak case finished in dark stain. It offers a cream dial with Roman numerals and a Westminster Whittington quarterly hour chime and hourly strike. A volume control and night-time silencer is also offered. Dimensions are: 21" x 13" x 4".

Seiko

SEIKO DIAMOND COLLECTION SPARKLES

Seiko's elegant new diamond case bracelets add sparkle with their gleaming goldtone brick links. A classic oval dial, in gilt or black, is complemented by gilt stick hour markers. A cabochon crown provides the final elegant touch.

For more information, contact Seiko's nationwide sales force.

Seiko

DIVERSIFIED TIME FROM BULOVA

Bulova recently introduced this multi-functional quartz watch crafted of all goldtone stainless steel. Its bright and polished case accents continue onto the goldtone stainless steel line bracelet.

Black Roman numerals and hands highlight a white sun/moon dial with three circular subdials which provide dual time, day of week, and calendar date functions. Additional features include water resistancey to 3 ATM, and a scratch-resistant Dura-Crystal®. The model shown is 92D54, and it has a suggested retail price of $195.00.

Contact: **Bulova Corp., One Bulova Ave., Woodside, NY 11377; (718) 204-3300.**

Bulova

JANUARY DEADLINES SET FOR TWO GIA SCHOLARSHIPS

The Gemological Institute of America (GIA) is accepting applications for the Ray Glynn Memorial Scholarship through January 30, 1990 and for the Arthur F. Gleim, Jr. Scholarship through January 31, 1990.

The Glynn Scholarship must be used towards either the Diamonds, Colored Stones, or Gem Identification home study courses. It is available only to legal residents of Alaska, Idaho, Oregon, Montana, and Washington. Applicants must have resided in one of the above states for at least the past year.

To be eligible for the Gleim Scholarship, applicants must be U.S. citizens or legal residents, and must have reached their 17th birthday. The scholarship must be used toward one of the following GIA home study courses: Diamonds, Colored Stones, Gem Identification, Jewelry Design, Jewelry Sales, or Jewelry Display.

All scholarship applications should be accompanied by a letter of recommendation from a jeweler, preferably typed on his or her letterhead. Applicants who are new to the jewelry industry may submit letters of recommendation from teachers, college professors, or previous employers.

To obtain an application, write to GIA at **1660 Stewart St., Santa Monica, CA 90404, Attention: Financial Aid.**

BULOVA PROMOTES JAMES CHAN MERCHANDISING DIRECTOR

James K. Chan has been promoted to Director, Merchandising and Product Development for Bulova Corp., it was announced recently by David Winkler, Vice President, Merchandising.

Chan, who is well known in the international watch industry, joined Bulova in 1986 as Manager of Bulova International in Hong Kong. In 1987, he was transferred to Bulova corporate headquarters, Woodside, NY, and promoted to Merchandising Manager. Mr. Chan will oversee Bulova product line planning, development, and the sourcing of product. Prior to Bulova, he served as Sales Manager, Prosperity Watch Company, Hong Kong.

Classified Ads

REGULATIONS AND RATES

Ads are payable in advance $.50 per word, $.60 per word in **bold type.** 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. January issue closed for copy on December 1st).

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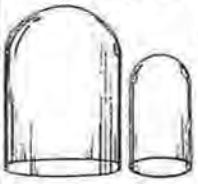

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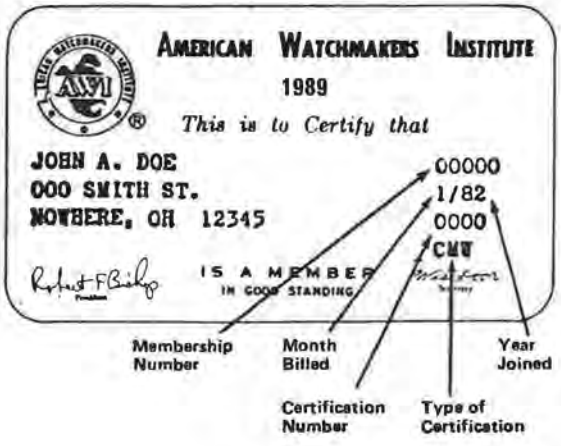

Dates to Remember

JANUARY 1990

14—AWI Southeast Regional Seminar; Orlando, FL.*

20-21—Repair of the Atmos Clock Bench Course (AWI); Dallas, TX.*

20-21—Advanced Quartz Watch Repair Bench Course (AWI); Tampa, FL.*

21—Introduction to Quartz Watch Repair Bench Course (AWI); Los Angeles, CA.*

25-27—Advanced Clock Repair Bench Course (AWI); Ft. Lauderdale, FL.*

27—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); Mobile, AL.*

FEBRUARY 1990

9-13—Inhorgenta 90, Munich Trade Fair Center, Munich, Germany. For information contact: Gerald G. Kallman, President, Kallman Associates, Five Maple Court, Ridgewood, NJ 07450-4431; phone (201) 652-7070.

10—Retrofitting & Casing Bench Course (AWI); Albuquerque, NM.*

10-11—Advanced Quartz Watch Repair Bench Course (AWI); Pensacola, FL.*

10-14—Introduction to Clock Repair Bench Course (AWI); Riverside, CA.*

11—Retrofitting & Casing Bench Course (AWI); Phoenix, AZ.*

17-18—Advanced Quartz Watch Repair Bench Course (AWI); Houston, TX.*

17-18—Repair of the Atmos Clock Bench Course (AWI); Pensacola, FL.*

18—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); San Diego, CA.*

24-25—Repair of the Atmos Clock Bench Course (AWI); Orlando, FL.*

25—Introduction to Quartz Watch Repair Bench Course (AWI); Jacksonville, FL.*

28-1—Cuckoo Clock Repair Bench Course (AWI); Cincinnati, OH.*

MARCH 1990

3-4—Advanced Quartz Watch Repair Bench Course (AWI); Phoenix, AZ.*

9-11—Advanced Clock Repair Bench Course (AWI); Atlanta, GA.*

10-14—Introduction to Clock Repair Bench Course (AWI); San Jose, CA.*

11—Retrofitting & Casing Bench Course (AWI); St. Louis, MO.*

18—AWI Southwest Regional Seminar; Los Angeles, CA.*

18—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); Oklahoma City, OK.*

18—Introduction to Quartz Watch Repair Bench Course (AWI); Montgomery, AL.*

24-25—Repair of the Atmos Clock Bench Course (AWI); Greensboro, NC.*

24-25— Advanced Quartz Watch Repair Bench Course (AWI); Albuquerque, NM.*

31-1—Repair of the Atmos Clock Bench Course (AWI); Alexandria, VA.*

31-1—Cuckoo Clock Repair Bench Course (AWI); Tucson, AZ.*

APRIL 1990

6-8—Horological Association of Virginia and the Virginia Jewelers Association Annual Convention; Embassey Suites; Richmond, VA.

8—Retrofitting & Casing Bench Course (AWI); Philadelphia, PA.*

20-22—Advanced Clock Repair Bench Course (AWI); Los Angeles, CA.*

21-22—Wonderful World of Gems; Veterans Memorial, 300 W. Broad St., Columbus, OH. Information: Robert Kell, 3848 Norbrook Dr., Columbus, OH 43220; (614) 457-1838.

22—Retrofitting & Casing Bench Course (AWI); Jasper, IN.*

22—Useful Techniques: Mechanical Watch Repair Bench Course (AWI); San Francisco, CA.*

22—AWI North Central Regional Seminar; Omaha, NE.*

27-29—Missouri Jewelers & Watchmakers Association Annual Convention; Holiday Inn, Lake Ozark, MO. For more information contact Sharon Blair (913) 661-0084.

29—Introduction to Quartz Watch Repair Bench Course (AWI); Little Rock, AR.*

MAY 1990

3-4—Advanced Quartz Watch Repair Bench Course (AWI); Lancaster, PA.*

3-4—Repair of the Atmos Clock Bench Course (AWI); Lancaster, PA.*

5-6—Cuckoo Clock Repair Bench Course (AWI); San Francisco, CA.*

***For more information on AWI Bench Courses contact AWI CENTRAL, 3700 Harrison Ave., P.O. Box 11011, Cincinnati, OH 45211.**

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BENCH COURSES

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* Introduction to Quartz Watch Repair
* Advanced Quartz Watch Repair
* Retrofitting & Casing
* Introduction to Clock Repair
* Advanced Clock Repair
* Repair of the Atmos Clock
* Useful Techniques: Mechanical Watch Repair
* Introduction to the Watchmaker's Lathe
* Cuckoo Clock Repair

Below is a listing of the seminars scheduled to be held during 1990 along with their locations.

If you are interested in information regarding any of these courses, please write to: **AWI BENCH COURSES, P.O. Box 11011, Cincinnati, OH 45211.** The information will be sent to you as soon as it is available.

1990

JANUARY

7	Retrofitting and Casing	San Diego, CA
14	**AWI Southeast Regional Seminar**	**Orlando, FL**
20-21	Repair of the Atmos Clock	Dallas, TX
20-21	Advanced Quartz Watch Repair	Tampa, FL
21	Introduction to Quartz Watch Repair	Los Angeles, CA
25-27	Advanced Clock Repair	Ft. Lauderdale, FL
27	Useful Techniques: Mechanical Watch Repair	Mobile, AL

FEBRUARY

10	Retrofitting & Casing	Albuquerque, NM
10-11	Advanced Quartz Watch Repair	Pensacola, FL
10-14	Introduction to Clock Repair	Riverside, CA
11	Retrofitting & Casing	Phoenix, AZ
17-18	Advanced Quartz Watch Repair	Houston, TX
17-18	Repair of the Atmos Clock	Pensacola, FL
18	Useful Techniques: Mechanical Watch Repair	San Diego, CA
24-25	Repair of the Atmos Clock	Orlando, FL
25	Introduction to Quartz Watch Repair	Jacksonville, FL
28-1	Cuckoo Clock Repair	Cincinnati, OH

MARCH

3-4	Advanced Quartz Watch Repair	Phoenix, AZ
9-11	Advanced Clock Repair	Atlanta, GA
10-14	Introduction to Clock Repair	San Jose, CA
11	Retrofitting & Casing	St. Louis, MO
18	**AWI Southwest Regional Seminar**	**Los Angeles, CA**
18	Useful Techniques: Mechanical Watch Repair	Oklahoma City, OK
18	Introduction to Quartz Watch Repair	Montgomery, AL
24-25	Repair of the Atmos Clock	Greensboro, NC
24-25	Advanced Quartz Watch Repair	Albuquerque, NM
31-1	Repair of the Atmos Clock	Alexandria, VA
31-1	Cuckoo Clock Repair	Tucson, AZ

APRIL

8	Retrofitting & Casing	Philadelphia, PA
20-22	Advanced Clock Repair	Los Angeles, CA
22	Retrofitting & Casing	Jasper, IN
22	Useful Techniques: Mechanical Watch Repair	San Francisco, CA
22	**AWI North Central Regional Seminar**	**Omaha, NE**
29	Introduction to Quartz Watch Repair	Little Rock, AR

MAY

3-4	Advanced Quartz Watch Repair	Lancaster, PA
3-4	Repair of the Atmos Clock	Lancaster, PA
5-6	Cuckoo Clock Repair	San Francisco, CA
18-22	Introduction to Clock Repair	Seattle, WA
20	Useful Techniques: Mechanical Watch Repair	Detroit, MI
20	Introduction to Quartz Watch Repair	Lincoln, NE
20	Retrofitting & Casing	Lafayette, IN

JUNE

1-3	Advanced Clock Repair	Kansas City, MO
2-3	Repair of the Atmos Clock	New York, NY
10	Useful Techniques: Mechanical Watch Repair	Nashville, TN

JULY

14-15	Repair of the Atmos Clock	Reno, NV
15	Retrofitting & Casing	Indianapolis, IN
29	**AWI Northeast Regional Seminar**	**Toronto, Canada**

SEPTEMBER

15-16	Introduction to the Watchmaker's Lathe	Phoenix, AZ
16	**AWI South Central Regional Seminar**	**Dallas, TX**

OCTOBER

21	**AWI Northwest Regional Seminar**	**Denver, CO**