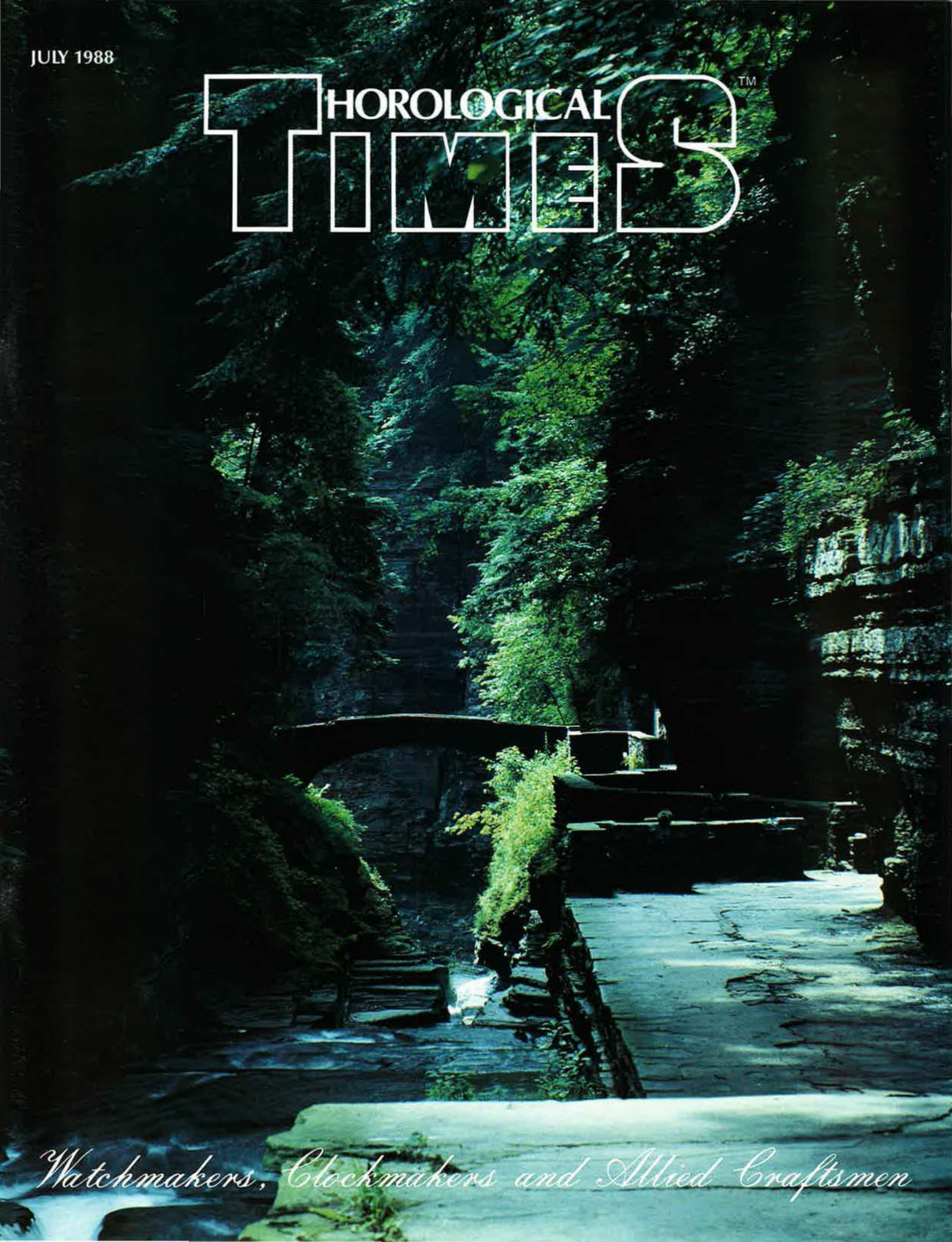
JULY 1988

HOROLOGICAL TIMES™



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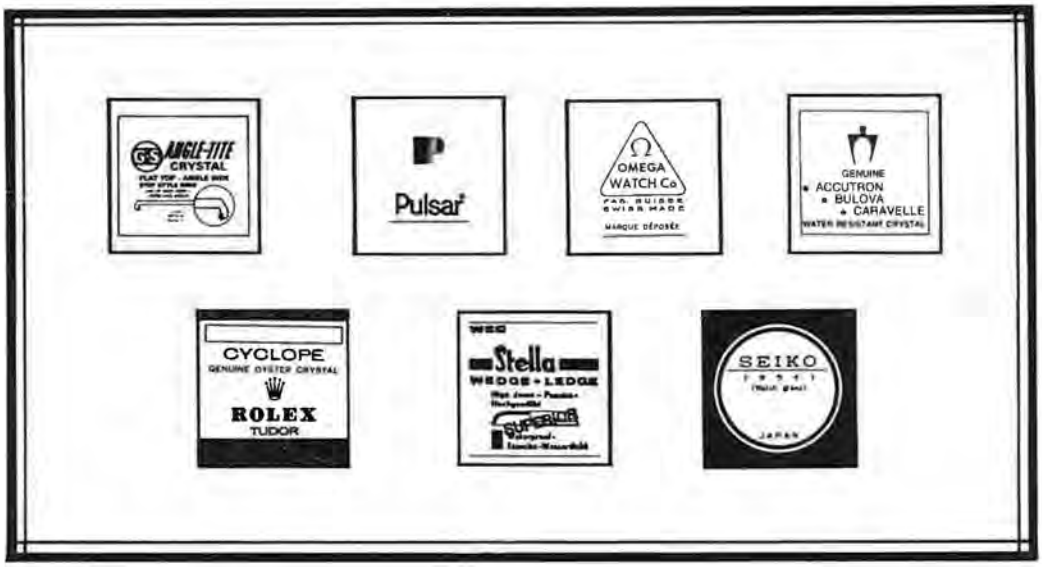

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Official Publication of the American Watchmakers Institute

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DEPARTMENTS

HOROLOGICAL TIMES (ISSNO145-9546) is published monthly and copyrighted by the American Watchmakers Institute, 3700 Harrrison Avenue, Cincinnati, Ohio 45211, for $40.00 per year ($4.50 per copy in the United States and $50.00 per year; $5.50 per copy outside the U.S.). Second class postage paid at Cincinnati, Ohio. POSTMASTER: Send address changes to HOROLOGICAL TIMES, P.O. Box 11011, Cincinnati, Ohio 45211.

OFFICE HOURS: Monday through Friday 8:00 AM to 4:00 PM (Eastern Daylight Time). Closed on all national holidays. AWI HOTLINE: (513) 661-4636 (24 hours, recording).

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UP FRONT

PROFIT THROUGH SELFISHNESS

For the past few years, we have been trying to encourage AWI members to become involved in AWI activities. It would appear that the benefits lay disproportionately on AWI's side, with few, if any, benefits available to the members we ask to donate their time and talents. As might be expected, we do not share this point of view. In fact, when we decided to get involved with AWI, it was for purely selfish reasons. We of course expected that our involvement would help AWI, but expected the personal benefits to be even greater.

Ever since we became interested in horology we have had the desire to be the best horologists we could possibly be. It did not take long to figure out that a great deal of what we needed to know could not be learned by reading books or by figuring it out on our own. The only way we could acquire this special type of knowledge was drawing on the unpublished experiences of other horologists.

Basically our plan was to get to know as many people as we could and get to know them well so that they would freely offer us any information we might require. To make this happen we would have to be where they were and do what they did. We went to bench courses and sought out like-minded people. We went to AWI Board Meetings and offered help on committees. We offered articles for publication in the *Horological Times*. We sent in bench tips and offered to create new bench courses. We offered help to state and local horological groups as well.

The plan worked well. The benefits we have received for our participation have vastly outweighed our donated efforts. Our horological skills and knowledge have increased greatly.

Our point is that there is great benefit to be had for a small contribution of time and talent. There is yet another benefit to such participation. Unless a person is very coldhearted and aloof, it is impossible not to become friendly with the people you will meet in the process. Some of our closest and dearest friends are people we have met through our dealings with AWI members, and that unpremeditated benefit has become the greatest benefit of all.

So, in closing, we would like you to consider it a profit-making adventure to give of your time and knowledge and become involved. Your life will be enriched in many ways.

Project and Development Committee

ON THE FRONT: Our front cover this month is the bridge above Lucifer Falls in Robert H. Treman State Park, located in Ithaca, NY. The photographer is Mark Krueger of North Boston, NY.

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AS PERFECT A TIMEKEEPER AS MODERN INGENUITY COULD DEVISE

By Mary Reed

Gateshead, England lies on the south side of the river Tyne, opposite Newcastle, of the "Carrying Coals" fame. It thus tends to be overshadowed--a point made in a speech at the clock's dedication to mark the gift of the clock to the town from its mayor, Mr. Walter Willson.

A contemporary account of the ceremony, published in the *Daily Chronicle* on December 20, 1892, noted that the clock contained "the latest improvements in horology." These included an automatic device for lighting the gas which illuminated the clock's four dials at night. Because the system was self-regulating, it needed no adjustments to provide proper illumination as daylight hours grew fewer due to the change of the seasons. This system of illumination had first been used in a clock made for the Manchester Town Hall by Gillett and Johnson of Croydon, Surrey: the same firm that built the Gateshead clock. The system was also used for a clock at the Royal Courts of Justice in London.

Photo by Chris Johnson, England

Gateshead's clock featured a gravity escapement and compensated pendulum; it required weekly windings. The *Daily Leader* published on December 21, 1892, provides the following information on the clock:

Construction:	cast iron with a weight of five tons, of which the clock's weights total a quarter-ton.
Tower Height:	25 feet.
Dials:	four, each 2 ft. 2 in. diameter, with copper figures on opal glass.
Movement:	in the base, movements connected by rod to the dials. Workings could be inspected through a plate glass panel at front of clock.
Decoration:	four coats each of three shades of green, highlighted by gold.

The design is best described as Victorian gothic, with much fancy decoration, spandrils and pinnacles, and a miniature cupola supporting a weathervane. The pride of Gateshead also had a second hand about which the "leader" speculated, "the first instance of a tower clock showing a second hand by which a watch may be compared."

The clock was dedicated at 3:00 P.M. on December 20, 1892 at a ceremony in which Mayoress Mrs. Willson set the clock in motion. The Mayor presented the clock to the corporate body, and was formally accepted on their behalf by Alderman John Lucas, the Deputy Mayor. The open air ceremony was attended by a number of civic dignitaries and the general public. Refreshments were provided afterwards at the Town Hall, in front of which the clock still stands in its original position.

The photograph of the clock looks much as it does in the engraving accompanying the *Chronicle* report, except that the top half of the weathervane has disappeared. Although the old Gateshead Town Hall no longer functions as such, the clock (now lit by electricity) is still keeping time and remains, as the *Chronicle* ventured to predict, "a standing monument to the munificence of the worthy Mayor," being "as perfect a timekeeper as modern ingenuity could devise."

Sources: *Daily Chronicle*, 20 December 1892; *Daily Leader*, 21 December, 1892; Mr. P. Conway, Central Library, Gateshead, England.

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Questions & Answers

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

Converting Hairspring Sizes

Q I have a problem concerning hairspring sizes. I have over 400 dozen old blue hairsprings without collets marked with Gr ("Gros" in French) sizes which do not correspond to the C.G.S. system. I have not been able to find anything about this system using Gr so far. Can you help me? I have sizes (Gr) from 1 through 26. How may I convert Gr to C.G.S.?

If someone is interested I would sell the whole lot if the price was high enough.

Thank you for your help.

Robert A. Barnes
Griesheim, West Germany

1440 Hairspring Gauge or Scale N.P. $2.50
The collet or heart of the old hairspring is held in the clip of the scale. The outer end is held in the tweezer. Then slide the movable weight on the scale beam until the point is at the zero mark and the graduations on beam will indicate the strength. The new hairspring should show same reading on beam as old spring, and a watch so fitted will require very little regulating. An additional lighter weight is furnished which is used either alone for very light springs or in connection with the other for heavy springs.

A *A photocopy of a hairspring gauge which I have taken from an almost century-old watch tool catalog (Cross & Beguelin c-1900) is shown here. You notice that the "strength" of a hairspring is gauged for practical reasons on the method shown in this illustration. In my book "Bench Practices," I show a similar method by which a hairspring is hooked and hung to the balance needing one, noticing how much the balance distends the hairspring. Generally, if it (the hairspring) had about 11 to 13 coils and the balance hung about 5/16th of an inch or about 8.00mm, the balance would vibrate at about 5 times a second. If the balance hung lower, then it would go slower.*

This tool gauge works on the same principle. If you look at it, the weight could represent one gram and the pull would be shown on the gauge with C.G.S.--possibly. A gram equals close to one cubic centimeter of water at normal density. Getting back to the gauge pictured. The curved dial upon which the pointer moves has but one reference mark, and that is a zero "0".

I've called Mr. Tarantino of the Hairspring Vibrating Co. of Carteret, NJ and he gets his springs from Europe with the C.G.S. marked on the packets. He said that, for example, those springs for 18 sized balances most often are marked 40.0 C.G.S., weaker ones 30.0, etc.

Those in the packet you sent appear to be for 18 size. I can suggest that you adapt a scale from a diamond scale or pennyweight gold scale and mark their relative strength accordingly, using the gauge pictured or some variation of it.

As for you selling these, no one I contacted seems to want to make an offer. I would suggest that you place an ad in the "Horological Times" with the description, diameters of the springs, composition, and quantity and put your own wanted price on them or accept the highest offer.

Q I am a clock repairman in Huber Heights, Ohio and average over 140 clocks per month through my shop for repair. I have worked on all types of clocks for nearly 30 years. I have never written to any publications before, but the "Questions and Answers" column (February 1988) has prompted this response.

The question asked by Greg Hostetter on the use of brass or bronze bushings needs to have an expanded answer because one cannot say that brass bushings are the best bushings to use in all circumstances. I agree with Mr. Fried's observation of old English clocks having worked for over two hundred years on brass bushings, but I do feel that the brass used in these clocks is far more superior

(Please turn to page 8)

than that which is available today. Mr. Fried further states he has read many books and listened to many speakers which state that brass is the better bushing. If all this is true, why is it that the Ansonia Clock Company is currently using bronze bushings in almost all their new clocks? Kieninger is advertising 22 bronze bushings in their new 9-tube movement and even jewels. Why?

The reason these companies (Hermle, Urgos and others) are using bronze is, in my opinion, to reduce the wear in their movements. Let's use Hermle movements as an example. In their movements (westminster, triple chime, or even the time and strike) the wear is so bad that after just 4 or 5 years the movements need to be cleaned, oiled, and bushed because the brass is not holding up. When a Hermle movement comes into my shop for repair I can usually figure on at least four or more bushings. When I first started repairing these movements I used brass bushings. I polished the pivots that fit the bushings, cleaned and oiled the movement, only to get the clock back six to eight months later. When I checked the movement over I found the brass bushings I had just put in were worn as bad, if not worse, than they were when I replaced them. When I started using bronze bushings, wear in the new bushings ceased to be a problem.

I believe there is room for both brass and bronze bushings and each repairman must learn when to use the proper bushing. For instance, in the old American-made movements brass bushings should be used because the pivots are softer than the new westminster and triple chime movements and bronze bushings would be detrimental to the pivot.

Also, if we can equate quality to cost, why are bronze bushings six to eight times the cost of brass? (Bronze costs 50 to 60 cents each and brass costs 8 to 15 cents each.)

I definitely feel that some of the newer movements (made in the past 15 to 20 years) need the heavy-duty bronze bushings to carry the load; or as Mr. Fried stated, "carry auto axles or machine work." In all reality, if the pressure on the pivots and bushings in some of these newer clocks was measured, it would probably carry as big (if not more) of a load proportionally than a car axle, thereby creating the need for a heavy-duty bushing. Also, what is a clock if it isn't a machine?

Finally, I would like to invite Mr. Fried to come out and see what is happening in today's modern repair shop. I believe the type of movement dictates the type of bushing to use.

Larry P. Yegerlehner
Huber Heights, OH

A I have read your letter with care. You make a good case for your arguments, but you also reveal some things that support my earlier statements.

When people like yourself, who repair and rebush so many clocks come across the clocks made in the last two or three decades, the use of bronze bushings may be justified. That is because the torque on normal brass bushings of today by these overpowered clocks with thinner plates is just too much pressure per square m/m for the brass of those plates on modern clocks with coarse cut pinions and quickly run-through cut wheel teeth. The older, time-honored and time-proven timepieces tick merrily for generations without ever having thicker, hammered brass plates and nicely polished pivots and pinion leaves. On weight-driven clocks of comparatively recent manufacture, the weights are heavier than those made in years when an heirloom didn't mean just one short generation or less.

Bronze may do well for these clocks if the pressure or torque seems excessive or proper brass bushings are not handy. For the old English or heavier plate chime clocks, brass of the proper composition is still recommended. Bronze would not only be out of place but might even reduce the restoration status of the repair.

I am pleased that you too believe there is a place for brass bushings and there is a place where indeed bronze would have a negative effect. It still gravitates to the fact that today's products assume a naivete' on part of the buyer who is easily wooed with surface glitz.

Your closing statement, "Also what is a clock if it isn't a machine" might be correct if you are thinking of today's products. I like to think that the clocks that will be cherished by the sophisticates of future generations are those who would feel insulted by calling such works of craftsmanship "machines." And yes, I do get around quite a lot in the horological world. I hope it helps us all.

Henry B. Fried

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Bench Tips

Joe Crooks

Shocking Pink "Gold"

This month's tip is from Wayne Stokes of Houston, Texas.

I was cleaning watch cases in my ultrasonic filled with sudsy ammonia, and there was a gold-filled nugget style band in with them. When I took them out of the cleaner they were all PINK except the 14K cases. I guess some of the cheap nugget style cases have a lot of copper in them and the ammonia will cause a chemical reaction and deposit copper on all the gold-filled cases and bands. I hope this will save you from a lot of extra work buffing the copper off.

Wayne, that "Alaskan" gold doesn't go as cheap as it should, does it?

Ammonia base cleaners will do some strange things. I remember back after WWII, due to a brass shortage, there was a lot of gold-filled jewelry that had a silver base instead of brass (that was way back when silver was cheap as brass, before your Hunt Bros. down in Texas got to playing with the silver market!).

If you left some of this gold-filled silver in with gold-filled brass base jewelry a few minutes too long, you had silver-plated jewelry! It didn't affect solid gold, only gold-plated over brass. "Electrolysis?" Seems like copper plating does the same thing.

Ultrasonically clean the nuggest by themselves and do it quickly to avoid a "plating" action in your case cleaning tank.

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

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FORUM

The FORUM is a column devoted to the discussion and debate of horological piffle, practices, and problems. Comments can be controversial, but should always remain within the bounds of good taste. Responses should be sent to:
AWI FORUM, P.O. Box 11011, Cincinnati, OH 45211.

Albert Dodson
CMC

Ralph Geiger
CMW, CMC, CEWS, CMBHI

We are fortunate to have received some responses to topics previously raised in the FORUM. Many thanks to those who took the time to write. They have made some interesting suggestions and we are hoping other readers will consider them and offer additional comments.

CLOCK NOMENCLATURE

Dear Sir:

As mentioned in the FORUM (April 1988 issue), it is certainly high time that a clean, fresh wind blew through the musty corridors of clock nomenclature—so let's go!

In teaching clock repair, I have used a simple number system of clock nomenclature for many years, because students rightly find the various traditional names totally confusing. To start with, we will abandon the term 'wheel' and use 'gear' in conformity with engineering practice. The term 'escape wheel' will be retained. We can easily call the arbors, gears, and pinions by logical numbers, starting with the source of power. #1 arbor bears #1 gear which drives #2 pinion on #2 arbor, and so on, up the train to an escapement or fan.

The trains and pivot holes are likewise easily referenced. T2B, for example, refers to: Time train, #2 arbor, Back pivot hold; S4F is: Strike train, #4 arbor, Front pivot hole.

A longcase clock is no more difficult. T2 just happens to be the minute arbor, but it still carries the T2 pinion and T2 gear and is still named T2.

All minute arbors carry a minute pinion which drives a reduction gear on the reduction arbor which carries a reduction pinion which drives an hour gear on the hour arbor. No more of this 'motion wheel' stuff.

A count gear, with or without teeth between the slots, is more like a gear than a wheel. The S2 arbor on an Ogee movement and the S3 arbor on a kitchen clock carry a slotted cam. It is not a 'locking cam' because it does not always lock the train.

The minute arbor carries an unlocking pin which raises #2 lifter assembly via several different combinations of lifters or hooks. Terms such as count hook, cam locking hook, lifting hook, and warning hook are reasonably well known and meaningful.

'Verge' started life as an escapement about six hundred years ago and now means a pallet assembly. Three centuries ago the recoil escapement superseded the verge, and as its pallet assembly looks like an anchor, it became so called. I vote for pallet assembly for both of them.

All this makes good mechanical sense, of course, but just try selling it to the old timers!

Sincerely,
John Plewes, CMC

(Mr. Plewes' letter raises another point that we of the AMERICAN Watchmakers Institute are often unaware. Mr. Plewes lives in Canada, and Canadian nomenclature is often different than American nomenclature.) —R.G.

REPAIR WARRANTIES

Susan Packer of Smithfield, UT suggests that a conditional co-op warranty might be a consideration for significant timepieces. Presumably this would work something like an auto warranty where the owner would be required to return the watch for periodic inspections in order to comply with the terms of the warranty. For instance, a one-year warranty would be offered, provided that the owner returned the watch for an inspection after 4 months and 8 months. The warranty is void if these conditions are not met. This could be a useful device to generate new sales.

DISPOSAL OF HAZARDOUS WASTE

Dear AWI,

After a local firm was fined for dumping a small amount of lacquer thinner behind their business, I checked with the local office of the EPA for suggested disposal methods of my cleaning and rinsing solutions. I was told to check the pH of the ammonia-based cleaning solution and mix in enough acid to neutralize it, and then flush it. Not knowing the composition of the solution, I was hesitant to do this. For the rinse solution, I was told to contact a local research facility and see if they would incinerate my solution with their used chemicals. I am currently checking into this method.

In doing further checking, I contacted the state (MN) EPA and was forwarded to an office at the state university that helps solve chemical disposal

problems. They in turn contacted the manufacturer to find out what is in the solutions so that they could be properly disposed of. The company was far less than totally cooperative. Based on their investigations, the university office found that the cleaning solution could indeed be flushed with no problem. The rinse was another matter. The rinse solution is rated as a hazardous waste and thus must be disposed of through a proper waste disposal facility. I was told that the local water reclamation plant would investigate whenever chemicals such as the rinsing solution started showing up.

The university suggested using alternate methods of rinsing, such as spin drying or using alcohol. Although alcohol is considered a hazardous chemical because of its low flash point, it is easier to dispose of. They also suggested contacting the manufacturers and asking them for alternate chemicals that are not hazardous, or at least less hazardous.

Many horologists laugh when asked about chemical disposal. "I use it to kill weeds," is a common response. These chemicals can be extremely hazardous to the environment and to us. Contact the state and local office of the EPA and get their suggestion for proper disposal in your area. In our state (MN), a hazardous waste generator number is required to use these chemicals, but regulations vary from state to state. The EPA will be more than willing to help you. Wouldn't it be better for you to contact them versus the EPA contacting you?

Sincerely,
Greg Hostetter, MBHI, CC

SHOP TALK

Wes Door, CMW

Service on Quartz

"We service what we sell," is a well used quotation, and I believe well worth repeating. It tells our customers that we have a repair department and we want to give service. It also tells our customers that we have merchandise for sale and (it should follow in our customers' minds) that we carry good and repairable merchandise since we are willing and able to stand behind it.

AWI membership is made up of all types of watchmakers, clockmakers, and other craftsmen. Some are salespeople, some are repairmen, and others are both. Some are retail and some are trade shop craftsmen. But all of us have one thing in common–we service a product and must be competitive in our prices and in our turn-around time. To do this we must have our shop set up to produce work fast enough to give this good service and still do first quality work at a fair price. To increase our production we must do more in less time without jeopardizing our quality. To do this we must be organized.

BEING ORGANIZED

Organization starts with the obvious things necessary to take in our repair jobs, like job envelopes, our favorite pen, and a visor on our head or our eye loupe attached to our glasses or placed at an easy-to-reach position.

To give service on our repairs necessitates this organization on our "take-ins." Our job envelope should include space for the customer's name and two phone numbers–both residence and business. If our customer gives us both numbers, check which one of them is the preferred number is when we fail to write it on the job envelope. I think this is one of "Murphy's Laws". Also, this same law I think this is one of "Murphy's Laws". Also, this same law says that if we do not get this phone number it may be unlisted or listed in another name and impossible to locate, and it will probably be the one time that we really need to talk to this customer about a repair job.

ORGANIZING OUR BENCH

To give quartz service we must have a clean bench, at least in our working area. We need special non-magnetic tweezers and screwdrivers, special testing equipment in a prime location, a new battery cabinet within close reach, and the AWI Battery Number System book (BNS). We use these batteries many times during each day, so we need to give them a priority spot. We give real service when we can fit batteries while the customer waits. Of course we scratch a date and our initials on the battery which we can use for future reference and for our protection.

If we find that other work is necessary (after trying a new battery), then we can tell our customer immediately and they can leave their watch. We can give a rough estimate and get an OK for a certain amount, or they might approve an "up to" amount, above which we agree to call the customer and re-estimate.

Crystals can be fitted while a customer waits if we have it in stock and if it is easy to fit. Those that require special fitting and/or sealing that requires setting under our heat unit should be left for repair.

ESTIMATES WHILE YOU WAIT

If possible, we like to give an estimate while the customer is in the shop. We can remove the case back and generally give a reasonable idea of the work necessary and our charges for this work. The customer can then say yes or no. We either have an OK to proceed or, if the customer says no, we have the opportunity to suggest a new watch.

If our customer agrees to the repair, we may be able to also sell a new crystal and maybe a new watch band if needed. We can also show our customer that worn crown and they generally will allow us to replace it. It is much easier to make these decisions face to face with our customer.

MODULE RETROFITTING

If their watch is worn and they still want to keep it, then maybe a new quartz module is the answer. It does surprise us to see a watch in which the band and case bezel has lost its plating and the customer definitely wants to keep it, maybe for sentimental reasons, and is willing to pay for a new module.

Module retrofitting is a new and profitable business if we are geared up for it. We must know the size and shape of the movement and its thickness. Also, the dial feet positions may not match, the hand holes may need to be closed or opened as they may not be the same, or a new pair of hands may need to be fitted. If it is a sweep second hand style, we must also fit this third new hand from our quartz hand assortment since these hands are counter-balanced. We must consider the possibility of changing the crown if the old one is worn and/or if it is of the wrong tap size.

SERVICE, SERVICE, SERVICE

Giving service on quartz watches (like any repairs on mechanical watches) is most important. They are here to stay and, therefore, we must be set up or get set up to handle this rather new but very profitable business.

Our Readers Write

There has been some discussion in the "Bulletin Board" column about whether it is practical for a watchmaker to use a computer in a one-man repair shop. I would like to share my experience with the readers of *Horological Times* and would welcome the opportunity for them to share their experience with me and others. This could be done by forming a "Users" group of HT readers.

I service ten jewelry stores and keep my own books and records. I began using an IBM compatable computer in 1982 and now think of it as a tool, just as are tweezers, screwdrivers, etc.

Using the commercially available "PFS File" program as my data base, I can now do my billing and also keep track of the jobs completed and the service performed. This is very convenient in case of an "ugh" comeback.

As you know, there are batteries to be changed in quartz watches and there are at least 20 manufacturers with different numbers. This program helps me cross reference the numbers different manufacturers use for the same battery. If a battery is missing, say for instance it measures .445, in an instant the computer screen will display all those having a .445 measurement.

I stock stems, staffs, and yolk bridges, many of which can be used in a number of different calibres. My computer can now tell me whether I have one of these parts in stock; it saves me from unwanted duplication of material. I also have a file that keeps track of the cost of material so that when I give an estimate, I have some idea of the cost of the material required.

I use the "Lotus" software for payables and receiveables, so I don't need a bookkeeper. I do it all at once when I do my billing. I have programmed it so all I have to do is fill in the amounts every week, and it keeps a running total as to how much each account has given me, and how much I have made to date, and what my cash flow is for the week. Since many of my bills are paid to the same sources, i.e: telephone, electricity, material, etc., it is easy to enter these into my payable program at the end of the month.

The word processing program and its spelling checker has been a special asset to me. Once you start using a computer you will find that you keep discovering more and more ways to put it to work. It's simply great for inventory, mailing lists, phone lists, etc. I hope this letter gives you some idea of the advantages of using a computer. Don't be afraid to try it. You did not learn to be a watchmaker overnight; learning to make the best use of your computer will also take a little time.

As I mentioned at the outset, I believe a "Users" group could benefit all of us so we could share ideas and new approaches to using the computer serve us better. If you are interested, please contact me. I'll even enter a "Users" group list on my computer disk.

Robert Cohen
3 Wynwood Roar
Danbury, CT 06811

Regarding Mike DiGuido's article in the May 1988 issue of *Horological Times*, I believe it should be strongly emphasized that this drastic technique should be reserved for clocks whose finish is absolutely beyond restoration. The vast majority of old clocks can be restored satisfactorily without stripping the old finish. If there is any way to preserve the finish, it should be, both for the value and for the historical significance of the clock—and there almost always is.

Jim Lowe
Red Hook, NY

I have just finished reading a very interesting article in the May '88 HT by Mike DiGuido regarding refinishing wood clock cases. I would like to mention a couple points of concern I had while reading his piece and also make some additional comments.

First, I feel it should be noted that the method Mr. DiGuido proposes, and indeed, any form of refinishing, may not be consistent with good conservation/restoration practices. If such is the desired goal, there are products available which are capable of reviving old finishes with astonishing results. If this is not possible then good restoration practice dictates that in the very worst case an identical-looking finish should replace the original. Mr. DiGuido implies that his refinishing process may yield a different appearance from that of the original. If conservation/restoration is not the goal, then I see nothing wrong with this approach and it should provide very pleasing results.

My next point of concern is the use of a toothbrush (or any sort of brush) to remove softened finish and stripper. This is an extremely dangerous practice without the use of eye protection as the brush will send spatters flying in all directions. One would also be well advised to do any stripping far from any painted objects—cars especially.

I have found that an excellent method of stripping a piece is to place it in an ultrasonic tank which is filled with a very low viscosity stripper. A few minutes in the tank will remove all traces of the old finish without the need for any sort of mechanical contact. The obvious advantage is there is little risk of damaging the surface, but the method will, of course, be limited to items of smaller size.

My last comment is in regard to steel wool. My experience has been that the judicious use of 4/0 (0000) steel wool will nicely 'polish' a wood surface prior to finishing. I agree that a coarser grade of steel wool may mar a surface, but 4/0 grade works so slowly as an abrasive that it is rather unlikely one will get into trouble while using it if one pays attention.

Ralph Geiger
Indianapolis, IN

Old Watches

Charles Cleves

Trends in the Watch Market

There were many records set during the past year in the field of watch collecting. Most of the records came from the firm of Habsburg Feldman, formerly Antiquorum, in Geneva, Switzerland. The highest price ever paid for a wristwatch was SFR 345,000, or approximately $245,000. The watch was a Patek Philippe minute repeating men's wristwatch, circa 1920. The case was made of platinum and was tonneau shaped. See Figures 1 and 2. This watch was one of a kind made on special request for Henry Graves, Jr.

Another record was set for a rare, two-crown "World Time" wristwatch, also by Patek Philippe (Figure 3). The outer revolving ring listed 41 cities around the world. The inner circle of the dial has an enamelled map of North and Central America. This watch sold for SFR 195,000, or about $138,000. Both of these watches were sold in October 1987.

Many pocket watches have been auctioned by Habsburg Feldman also. Figure 4 shows a picture of a Vacheron & Constantin flat minute repeating pocket watch in the original 18K gold, fully signed case. The watch was in excellent condition. It sold for $2,095 plus the 10% buyer's fee for a total of $3,195. While the demand is still strong, the price is not near the $5,000-$6,000 price these watches were bringing in 1981. After subtracting the 10% buyer's fee and the 10% seller's fee, the owner received $2,615. This is not much money when compared to the excessive prices the wristwatches are bringing.

Many older, more experienced collectors don't think it is logical for a watch like this Vacheron & Constantin minute repeater to sell for approximately 2% of the price of the "World Time" wristwatch. The Vacheron & Constantin minute repeater, circa 1900, would probably cost $50,000 to reproduce. The Patek Philippe "World Time," circa 1950, would probably cost $10,000 to reproduce. Seven years ago the Vacheron was selling for $6,000 and the wristwatch would have sold for $3,000. Many collectors bought high-grade pocket watches in 1980 and 1981 as an investment, only to see their values go down.

In wristwatches, there are many areas in which prices are starting to top out and some even fall. Rolex gold bubblebacks have not increased in price during the last three months and have fallen slightly. Five months ago prices took a big jump, perhaps too big of a jump. Be very careful the next few months if you are planning to buy expensive wristwatches for investment purposes. The April auction in Europe brought many surprises. Prices were not as strong as before and there were many items that did not bring their reserves. In short, many items seemed to have peaked four to seven months

Figure 1

Figure 2

Figure 3

Figure 4

ago. Since the majority of the wristwatches are being sold back and forth from dealer to dealer, prices can drop in a hurry. Perhaps this is just a temporary setback, but it bears a close watch.

For investment purposes, I think it's an excellent time to buy high-grade pocket watches and a good time to sell expensive collectible wristwatches. The wristwatches went up in price too fast. The pocket watch and coin collectors know what happened to coins and watches after the prices skyrocketed out of control in 1981. Last year, I would have bought watches in the $20,000 and up range and set them aside as an investment. Now I would look immediately for a buyer because the market is a little too shaky for me. Prices are still pretty strong on the watches under $2,000. They are more affordable to the small collectors and dealers and the demand is still on the rise. Perhaps another reason the lower end watches are still strong is that most of them are saleable to the public rather than just collectors.

During the past year, chronograph watches have gone up the most in price. Both stainless steel and gold have risen significantly because of the Italian market. A couple of years ago, the Italian president appeared on television wearing a Rolex 18K yellow gold Daytona chronograph. The television camera focused on the watch on several shots. It sparked a desire in the Italian market to own chronographs. During the past year, the Rolex 1950 model waterproof stainless steel chronographs, marked "antimagnetic" on the dial, have tripled in price. The only reason they went up so high was because of the Italian buying frenzy. Patek Philippe stainless steel chronographs more than doubled in price within the last 12 months for the same reason.

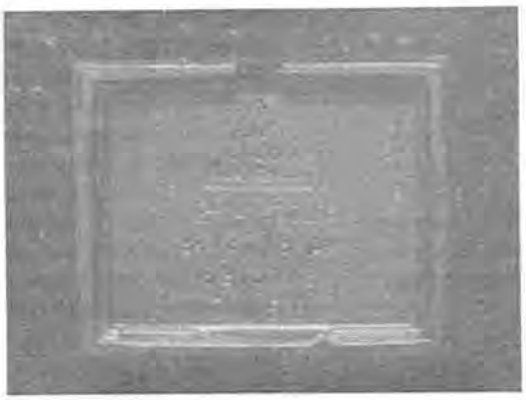
The other watches that increased rapidly over the last year are: Patek Philippe stainless steel, Patek Philippe platinum, enamelled bezels, cloissonne dials, all repeating watches, and all perpetual calendars and moonphase. The most significant increases took plate eight months ago.

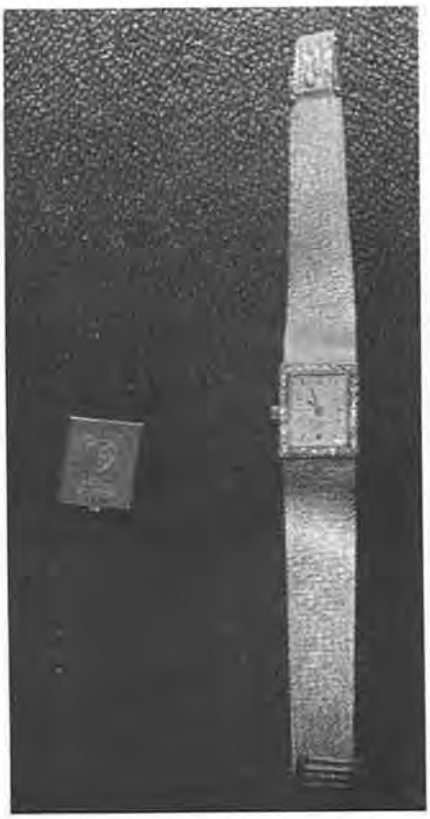
I wish I could tell you which watches will double in price during the next 12 months. From the recent slowdown in prices I think the answer will be very few. I think sooner or later ladies wristwatches will be collected. Because of the weak dollar on the foreign markets, whatever the Europeans or Japanese start buying will be the watches to look for.

IDENTIFICATION NEEDED

The Pittsburgh Police Department asks for assistance in identifying the owner of the watch shown here. The back of the watch is engraved: *MADELYN, I LOVE YOU, GERALD, 2-14-84.* The jeweler's repair mark inside the case is D5018J.

If anyone has any information regarding this watch, they are asked to contact: **Det. J. Kilkeary, 1600 W. Carson St., Inv. Br. Burg. Sq., Pittsburgh, PA 15219.**





Eight Views of the Tissot Rock Watch

Henry B. Fried

FROM UPPER LEFT TO RIGHT: 1) Rough stone disc. 2) Counterbored dial side upon which will be the dial indications. 3) Counterbored movement side. 4) The metal disc with its six threaded holes to receive the metal back and gaskets seated and permanently secured to the rock case. 5) The movement and crown seated in through the back of the case. 6) The case back with its leather strap flanges secured to the case via the metal disc shown in 4 and 5. 7) Dial which is part of the rock case with hands now attached. 8) The sapphire crystal epoxied into place and leather strap attached.
(NOTE: the sapphire crystal can be removed after placing the empty case in boiling water to soften the epoxy type used and then removed by vacuum cup or blowing out through vacated cannon pinion-hour wheel hole in the one-piece rock case.)

We Salute These New Members!

BACON, George W.–Toronto, Ontario, Canada
BAKER, Hayward–New Glasgow, Canada
BASCOVE, Stephen M.–Philadelphia, PA
BABER, James M.–Ely, MN
BECKER, Randy–Great Falls, MT
BOAL, Richard H.–Garden Grove, CA
BOTTERBUSCH, Ronald L.–Dover, PA
BRADY, Tim–Martinez, CA
BROCKHURST, W.W.–Bay Village, OH
CARTER, Barry–Victoria, B.C., Canada
CHA, Chong Nam–Wichita, KS
CHAMBERS, Kenneth W.–Irvine, CA
CHEBLI, Eli–Lansing, MI
CHISHOLM, Jason–Port Credit, Ont., Canada
Sponsor: Robert Phillip–Cookstown, Can.
CLARK, Roger C.–Bangor, ME
COOKE, Eileen C.–Hughsonville, NY
DALEY, Joseph–Surfside Beach, SC
DIAMOND, William W.–Miami, FL
DIETEL, Rik–St. Petersburg, FL
EL-HAGE, Rami–Arlington, VA
ERICKSON, Charles E.–Cheshire, CT
FILLMAN, D.J.–Tucson, AZ
HER, Mora Sue–St. Paul, MN
HILL, Allan J.–West Hill, Ontario, Canada
HOLMAN, Roy L., Jr.–Oakland, CA
HOUSTON, Jack V.–Klamath Falls, OR
JOHNSON, Jimmy D.–Montgomery, AL
JOHNSON, Lewis–LaSalle, IL
Sponsor: Greg Hostetter–Rochester, MN
JUAIRE, Joe–St. Paul, MN
KARP, Jack–Brooklyn, NY
KHAMHAENG, Sanya–Farmingdale, NY
KISER, Michael L.–Greenville, OH
LANEY, Maurice Joseph–Adelaide, Australia
Sponsor: R.F. Whitten–Newcastle West, Aus
LELIEVRE, John L.–Natick, MA
LEWIS, Ronald C.–Mechanicsburg, PA
LOGAR, Alexander–Bethesda, MD
LOUDERMILK, Edith M.–Tacoma, WA
LU, M.K.–Anaheim, CA
Sponsor: James E. Williams–Chino, CA
LUCAS, John–Richmond, VA
LYNCH, John P.–Fitchburg, MA
MAIMONE, Thomas–Warsaw, NY
MENDEZ, Gilbert–Corpus Christi, TX
MEWS, Donald W.–Tacoma, WA
MEYER, David M.–St. Louis, MO
MOFFITT, Edward (Ned) G.–Great Falls, MT
MONTELL, Dominic J.–Westlake, OH
MORITZ, Jay–Portland, OR
MULLANEY, Richard C.–Somerset, MA
Sponsor: Leo A. Jaroslaw–Acton, MA
NARDI, Gene–Springfield, IL
OVERBEY, Lawrence M.–Grand Prairie, TX
PATTON, Everett–Newark, OH
PERKINS, Tom–Pasadena, TX
POTTHOFF, William H.–Glastonbury, CT
PREAS, Gary D.–Goldsboro, NC
RAMBO, Charles W.–Wilmington, DE
RETHERFORD, Edward L.–Kokomo, IN
Sponsor: James Broughton–Columbus, OH
SCHEIN, Jack–North York, Ontario, Canada
SCHMID, Gary–Burlington, Ontario, Canada
SEELEY, Jay L.–Gregory, SD
SIMMONS, Jeffrey G.–Beaumont, TX
SIMMONS, Raymond J.–Minocqua, WI
SKAJA, Craig–Chicago, IL
SMITH, N.Kenzie–Jefferson, MD
Sponsor: Daniel Spath–Ellicott City, MD
STAMPER, Floyd L.–Sycamore, IL
STEINES, Suzette–Dubuque, IA
STOLTZ, Herman Andy–Marion, IN
SUPERCHI, Vito–Cicero, IL
THAO, Sao–St. Paul, MN
TRAN, Cam Binh–Philadelphia, PA
VAN AUKEN, Arthur D.–Canton, NY
VEGA, Danny Gracia–Newark, DE
VOGEL, Robert J.–Madison, WI
WESTERHOLM, Paul L.–Hopewell, VA
Sponsor: Marvin Whitney–Alexandria, VA
WHITE, Robert T.–Denver, CO
WILLIFORD, Charles Allen–Goldsboro, NC
WONG, J. Chan–Rotorua, New Zealand

Band Adjustments

PART 2

Other types of Seiko bands with which the watchmaker must deal are presented in this second part of "Band Adjustments" by Hattori Seiko Co., Ltd. Some are similar to bands the watchmaker has dealt with before, some are not.

PUSHPIN TYPE

1. **Removing links**
   Using a pin-pusher, press the spring bar in and twist gently for removal (Figure 1).

2. **Reassembly**
   To reassemble, reverse the above procedure. That is, insert the pushpin in the body of the link. Make sure that one end of the pin is securely in the pushpin hole, then depress the spring bar until it fits in the top hole of the link.

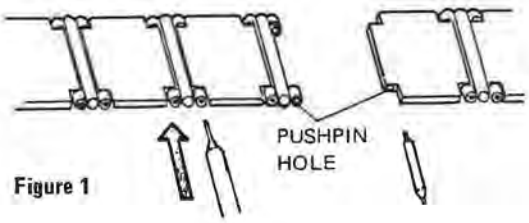


Figure 1

CLIP SPRING TYPE

1. **Removing links**
   Insert pin-pusher, one end of the fine needle-nose pliers or clip spring adjusting pliers (S-919) in the hole (or in open space) of clip spring (Figure 1). Slide clip spring in the direction of the arrow (Figure 2).

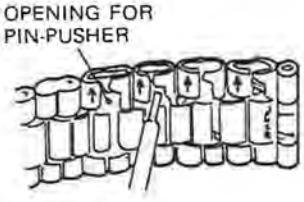


Figure 1

2. **Reassembly**
   To reassemble, align the links properly and reverse the above procedure. Make sure to press down the clip spring securely into the link.

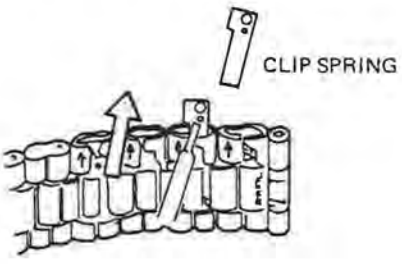


Figure 2

SCREW PIN TYPE

1. **Removing links**
   Using a bracelet adjusting screwdriver, turn the screws counterclockwise for each type (Figure 1 through Figure 5).

2. **Reassembly**
   Join the links together and insert the screw into the link. Turn the screw clockwise to fasten.

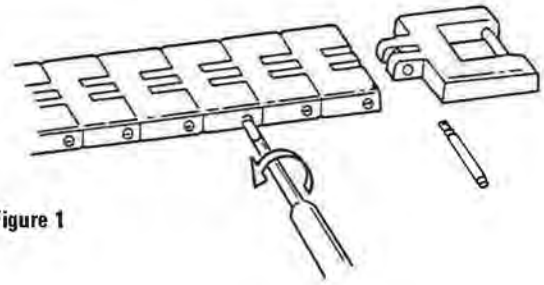


Figure 1

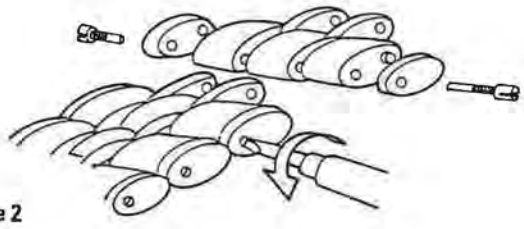


Figure 2

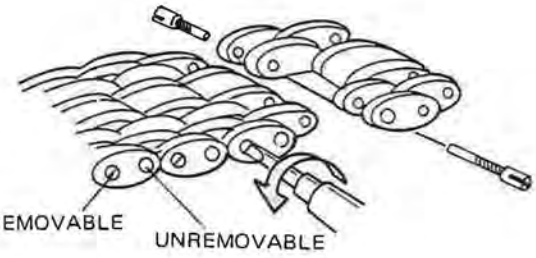


Figure 3

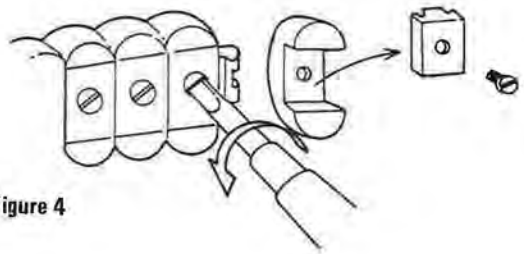


Figure 4

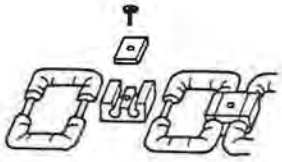


Figure 5

TWO SIDE FIXING PIN TYPE

1. **Removing links**
   Place pin-pusher at the middle open space of the links (Figure 1). Push the pin out in the direction of the arrow mark on the link. Do the same on the other side of the link. NOTE: There are several types of fixing pins, such as constricted pin (Figure 1) or a bobby pin shaped pin (Figure 2).

2. **Reassembly**
   Reverse the above procedure by inserting the pin in the opposite direction of the arrow. Make sure to press down the fixing pin securely into the link.

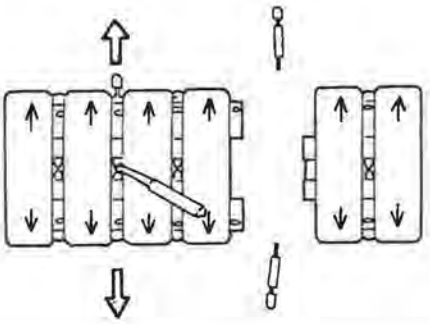


Figure 1

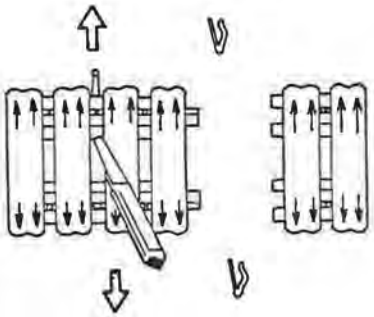


Figure 2

CENTER CLIP PIN TYPE

1. **Removing links**
   Insert pin-pusher or one end of fine needle-nose pliers into hole of center clip pin (Figure 1). Slide it in the direction of the arrow to push center clip pin out of the link (Figure 2). Remove the links (Figure 3).

2. **Reassembly**
   Join the links and put center clip pin in the middle of the link. Insert pin-pusher into hole of center clip pin and push it in the opposite direction of the arrow.

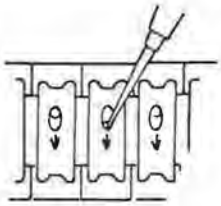


Figure 1

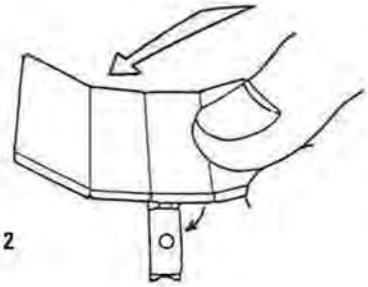


Figure 2

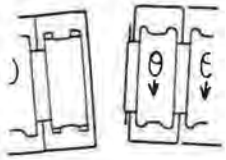


Figure 3

FIXING PIN TYPE

1. **Removing links**
   Using a pin-pusher, push the link fixing pin in the direction of the arrow mark on the link. NOTE: There are several types of fixing pins, such as an "S" shape pin (Figure 1), a bobby pin shape (Figure 2), or a constricted pin (Figure 3). If there are no arrow markings on the links, push the pin out from the flat head side of the pin.

2. **Reassembly**
   Reverse the above procedure by inserting the pin in the opposite direction of the arrow.

Figure 1

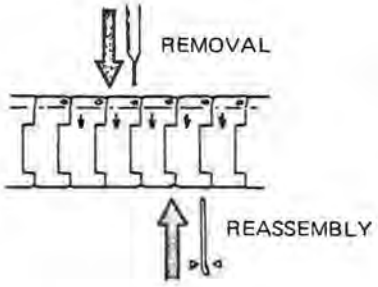


Figure 2

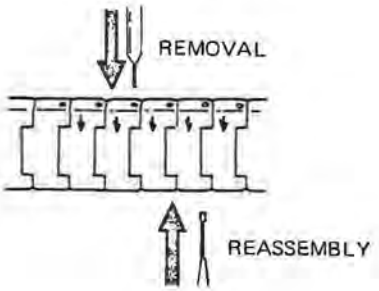
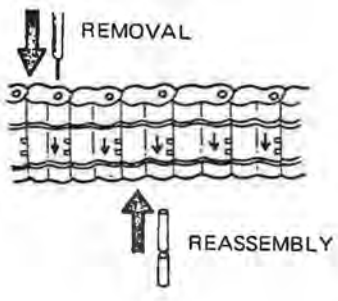


Figure 3



Book Review

ULYSSE NARDIN CHRONOMETERS, POCKET WATCHES AND WRIST WATCHES, with 1988 Price Guide by Tran Duy Ly. 20 pages with soft cover, 8¼"x11", black & white photos. Price $4.95. Printed by the Arlington Book Company, P.O. Box 327, Arlington, VA 22210-0327.

This reprint is of a catalog entitled *Chronometric Ulysse Nardin* published in 1920 by Bigalke & Eckert Co., New York City, sole agents for Ulysse Nardin in the United States, with the addition of a 1988 price guide by Tran Duy Ly.

Ulysse Nardin, son of Leonard, a remarkable watchmaker, founded the firm in 1846. Thanks to his remarkable qualities as a watchmaker, he was accorded the highest awards at numerous expositions. In 1876 he died suddenly and the responsibility of running the firm fell on the shoulders of son Paul D., who had not yet turned 20 years old. Two months after his father's death, Paul, an adjuster, was awarded the gold medal at the International Competition of Adjusting Chronometers, held at Geneva. His success brought him world-wide publicity. Soon Paul started producing marine chronometers which made the name of Ulysse Nardin famous throughout the world.

The United States Naval Observatory first began purchasing torpedo boat watches (deck watch/pocket chronometer) from Nardin in 1906 and marine chronometers in 1913, a practice that was continued until the Nazi sealed off the Swiss borders in 1942. Many of the models shown in this reprint are of those purchased by the U.S. Navy. Trial records indicate high performance with very few rejects.

Through the years, Nardin's instruments continued to win more than their share of observatory competitive awards for excellence at Neuchatel and Geneva. Because of their high performance, not only in foreign competition but during chronometer trials at the Naval Observatory, the U.S. Navy selected the Nardin Marine Chronometer as the model to be prototyped by the Hamilton Watch Company in 1940. Hence, Hamilton defied tradition, developing modern production equipment which produced an instrument whose overall performance far exceeded that of any ever made. This was a sterling tribute, not only to Hamilton's engineers/craftsmen, but likewise to those of Nardin.

In the past few years there has been a remarkable growth in the interest in chronometers and chronometer-type watches. This catalog is representative of navigational timepieces of that era, and should be of interest to those who are interested in the science of chronometry. As with any price guide, the prices herein are fairly representative for the reader to use as a reference base.

Marvin E. Whitney

Novice Watchmaker

James Adams, CMW, CMBHI

Economics of Horology

While I was in horological school, they did a good job of pounding into my head how to fit staffs, vibrate hairsprings, set jewels in brass settings for pocket watches, and a myraid of other things. What they didn't teach was the nuts and bolts of watchmaker economics.

I walked out of the hallowed halls a highly trained, top-of-the-art watchmaker. But I could not and was not able to compute my value in the labor market. What was I, a highly trained, top-of-the-art watchmaker, worth? What were the various aspects of my training, worth in wages, and service fees charged? I didn't know. Was I to base my worth on salary offered? (Yes, that's what I did.) Or should I dictate to an employer what I wanted? This approach would get me thrown out of any store or shop I might be foolish enough to try that in.

In order to attend watchmaking school during the day, I worked from midnight to 8:00 AM in a factory. Upon graduating from watchmakers' school, I was offered a job at less than my factory wages. I grabbed it; a foot in the door so to speak. In my employer's mind I was worth less than a factory worker, and he was correct. We also agreed to a 30-day trial period; either of us could back out with no questions asked.

You may experience something like this fresh out of school or apprenticeship. But what about those wishing to work for themselves? How do you fix a fee rate? Do you call on repair departments and ask for price quotes for bogus repairs? No. Their rates will be different, do doubt, than what you require. Why? They may be running that repair department as a "necessary evil" to enhance other departments. Or, they may be terribly out of touch with the reality of profit and loss. Or, of course, they may be near what you need. So what should you do?

In order to know what is a fair market value of your services you must know your overall overhead expenses and the value of your labor per minute. Then you can judge labor cost by how much any given type of job consumes time. For instance:

OVERHEAD COSTS

Personal housing rent	_____
Utilities	_____
Food	_____
Insurance, clothing	_____
Miscellaneous	_____
Auto expenses	_____
Business room rent	_____
Tools	_____
Insurance	_____
Utilities	_____
Miscellaneous	_____
Grand total of overhead	_____
Wages expected	_____

LABOR WORTH PER WEEK

If 40 hours labor, time is worth $_____ per minute.

If 50 hours labor, time is worth $_____ per minute.

UNIT OF LABOR VALUE IF

Watch, regular wind takes_____ minutes, job income $_____.

Watch, auto. wind takes_____ minutes, job income $_____.

Watch, crown takes _____ minutes, job income $_____.

Watch, stem takes _____ minutes, job income $_____.

Watch, quartz takes _____ minutes, job income $_____.

and so on.

With a little thought and time invested, your unit of labor/wage can be determined.

Each part of the country has quite a different cost of living index. What may be correct for New York City will be incorrect for Detroit, New Orleans or rural United States.

There is one other factor to consider—inflation over a given period of time. What may be correct today will be woefully outdated five years from now. Time passes swiftly and we do fail to keep our overhead/labor values up to date. I'm as guilty as the next person on this score. The thing to remember if you are self-employed is to update your grand total overhead annually.

A very fine craftsman, with a business head to match, is Ray Vance, CMW, trade watchmaker, who sent me a letter, part of which is reproduced here.

> "I have been doing trade watch repair for 26 years. In 1971, when I left industry to pursue trade watchmaking full time, I made myself a promise that if and when I reach the point where I can no longer make a comparative wage, I would take down my shingle and seek other employment.
>
> "This new price guide is 4 times greater than the one I started with 26 years ago. I still live in the same house, but today it is appraised at 5 times the value it was then. A new, fully equipped automobile cost $2800 to $3200. Today a comparable model costs $12,000 to $15,000. I still wear the same style/brand of blue jeans I paid $6.00 for then, but today I pay $38.00 to $42.00 for them. Groceries, utilities, insurance, taxes, and all repair and construction costs are approximately 6 times greater than in 1962."

This type of article should be read and acted upon once every year. So at 9:00 AM on January 1st each year, drag this article out, read it, and believe.

Please bear in mind that personal expenses are paid by wages. Gross income pays operation expenses and wages. So you must compute your overall cost of doing business on a regular basis.

Please understand this is an oversimplification of a very complex subject, but it should put your mind on the right track. HT

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 send 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.

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

MILITARY TIME

Marvin E. Whitney, CMW, CMC, FAWI

Aircraft Clock

Type A-11

LeCoultre, Model 201

8-day, 19 ligne, 7 jewels

Figure 1. LeCoultre, Model 201, 8-day, 19 ligne, 7-jewel, type A-11 aircraft clock.

Figure 2. Dial view of LeCoultre's Model 201, type A-11 aircraft clock.

This 7-jewel movement was encased in a two-piece dull black metal case designed to fit into the aircraft's instrument panel, and was secured to the panel with two screws with self-locking nuts. The top part or bezel was secured to the case with four side screws. The crystal, gasket, and reflector ring were inserted into the bezel from the inside. The movement was held in the case well by three screws whose heads protruded from the back of the case. On the back of the case were two sealing cap screws which made it possible to regulate the clock and adjust the winding and setting mechanism without having to remove the movement from the case. The inside of the case well was stamped Longines-Wittnauer Watch Co., Inc., the casemaker and also LeCoultre's agent in the United States. Instead of having the frontal stem and winding knob (crown) located at the usual 6 or between the 7 and 8 o'clock positions, it was located between the 1 and 2 o'clock positions. However, the clock shown in Figure 1 shows the stem and winding knob protruding from the side of the case. The position of the stem and knob on this particular aircraft clock was altered so it could be used as the time source on a special project.

The dial was black and had luminous numerals at the 3-, 6-, 9-, and 12-hour positions. Luminous dots and lines marked the remaining hour and minute graduations. Each 5-minute graduation was identified by small luminous numerals. The minute graduations also served as an index for the sweep second hand. The hour and minute hands were coated with a luminous material, and the sweep second hand was also

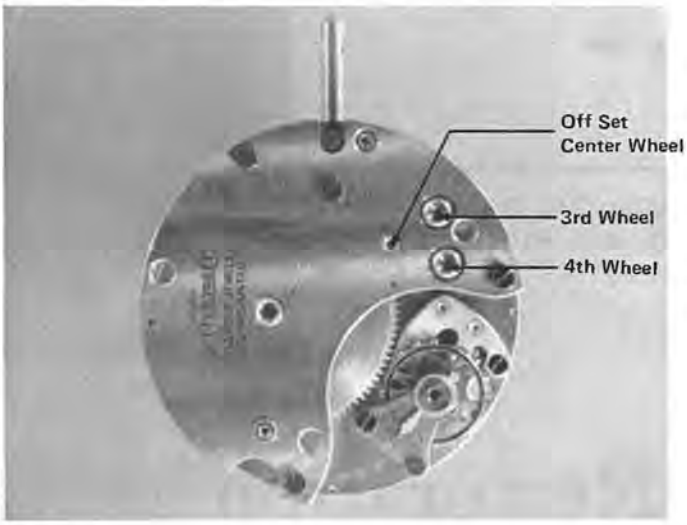


Figure 3.

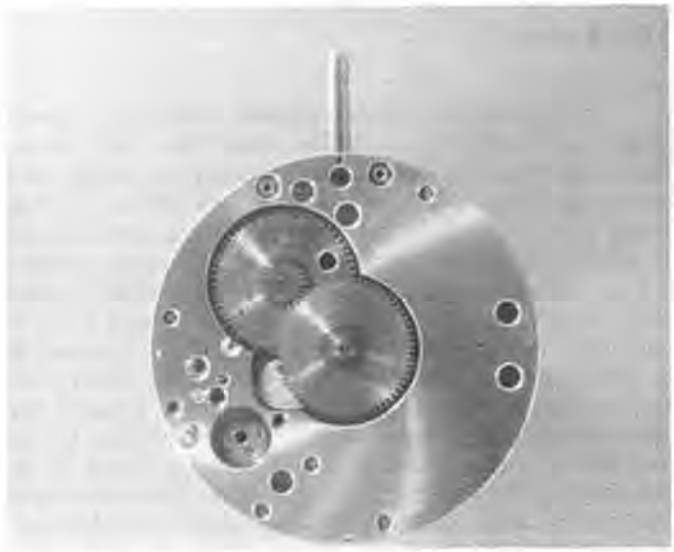


Figure 4. Dial side view of LeCoultre Model 201 with hour wheel and minute wheel and pinion in place.

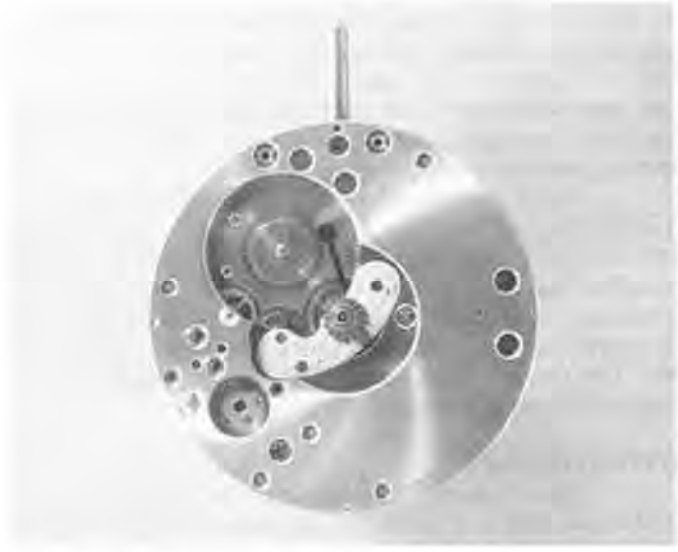


Figure 5. Dial side view of LeCoultre Model 201 with hour wheel and minute wheel and pinion removed showing the free-riding cannon pinion positioned over the sweep second idler and sweep second wheel bridge.

tipped with the same material (Figure 2). The words "8-days" appearing just below the figure 12 was also painted with a luminous material. The identification marks A.F., U.S. Army, Type A-11 were stamped on the dial, above the figure six.

The LeCoultre, model 201 aircraft clock was powered by a single barrel-mainspring assembly, the mainspring measuring 4.10mm x 0.265mm x 35¼ inches. Because of the unusual large mainspring barrel in this 19 ligne movement, the off-set center wheel was employed (Figure 3). Thus, the large driving wheel was not positioned at the center of the movement. To provide transmission of motion to the hands (Figure 4), the cannon pinion rode freely on the hollow post of the sweep second idler and sweep second wheel bridge which was positioned at the center of the movement (Figure 5). The cannon pinion meshed with the minute wheel which was fitted friction tight to the upper extended pivot of the third wheel. Thus, instead of the friction occurring at the usual point—between the cannon pinion and center wheel arbor—it occurred between the upper third wheel pivot and minute wheel.

The sweep second wheel and pinion was positioned in the center of the pillar plate on the dial side with the upper section of the arbor and pivot passing through the hollow post on the sweep second idler and sweep second wheel bridge. The sweep second wheel meshed with the sweep second idler wheel, which in turn meshed with an addendum wheel on the 4th wheel. A thin flat tension spring, pressing downward on the sweep second wheel, prevented backlash in the gear mechanism, and thus permitted the sweep second hand to be driven with a minimal amount of shake.

Technically WATCHES © 1988

Archie B. Perkins, CMW, FNAWCC, CMBHI

Antique Watch Restoration © 1988

Part XXXI

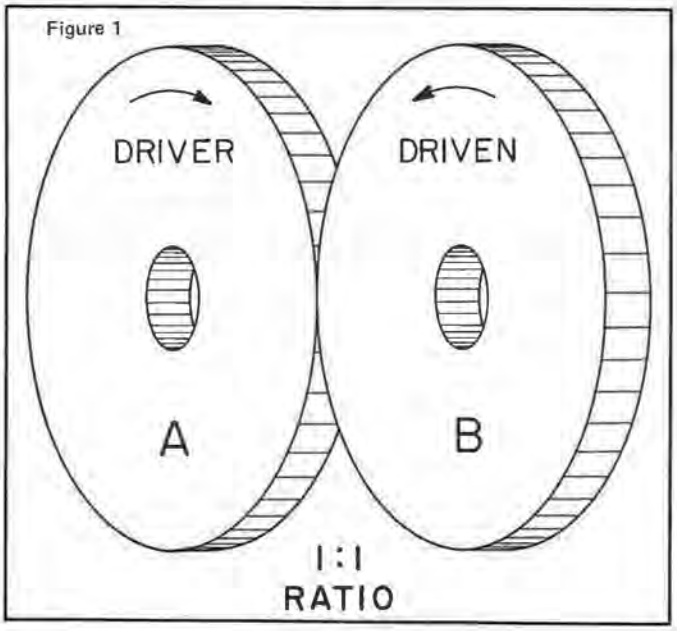
CALCULATING GEAR TRAINS

When restoring antique watches, it is very important that the watchmaker understands the principles of gearing for five reasons:

1. To calculate the train to determine the number of vibrations the balance wheel must make when fitting a new hairspring.
2. To calculate for a missing wheel or pinion to determine the correct number of teeth or leaves they must have.
3. To be able to design new gears to replace damaged or missing gears.
4. To be able to recognize faulty gears and be able to correct them.
5. To be capable of making gears to replace the damaged or missing gears.

There are two gear trains in a watch: the main power train and the dial train. The main power train serves two purposes. The main purpose is to drive the balance wheel to cause the watch to keep the proper time, and secondly, to drive the dial train and hands to indicate the time.

Figure 1



The main train has a stepped up ratio. In a train which has a stepped up ratio, the wheels drive the pinions. This is the reverse of the dial train in which the pinions drive the wheels. To explain the two situations further, the following examples are used. Let us suppose that we have, instead of wheels and pinions, plain discs that are turning together at their edges as shown in Figure 1. Of course, each disc would have an axle through its center and pivoted into holes in plates like regular wheels and pinions. Also, the discs would be turning against each other without slipping. Since both discs are of the same diameter, then when disc A makes one revolution, disc B would also make one revolution. In this case, disc A is the driver and disc B is driven by disc A, although it wouldn't matter which disc is the driver since both discs are the same diameter. This is a 1 to 1 ratio between the two discs. It would not matter how many discs were placed edge to edge between these two discs, the ratio between the two outside discs would remain the same. This is called a simple train.

Figure 2 shows a different situation. In this example, the large disc A is driving a smaller disc B. The small disc is one-third the diameter of the large disc, which means that when it is driven it will make three turns to one of the large disc. Also, when driven, the small disc will turn three times as fast as the large disc. This is a 3 to 1 ratio. This is a stepped up ratio, the same as the main train of a watch.

Figure 3 shows an example of the reverse. Small disc A is the driver of large disc B. The large disc B which is being driven is three times larger than the driving disc A. In this situation, the small driving disc would have to make three revolutions to one turn of the large disc. Likewise, the large disc would turn only one-third turn to one turn of the smaller disc. This example shows a 1/3 ratio. This is a stepped down ratio and is used in dial trains of watches.

STEPPED UP RATIO

Figure 4 shows an example of the stepped up ratio of the time train of a watch. Let us assume that disc A is the center wheel of a watch, disc B is the third wheel, and disc C is the fourth wheel. Also assume that disc "a" is the third wheel pinion, disc "b" is the fourth wheel pinion, and that the edges of the discs turn against each other without slipping.

Figure 2

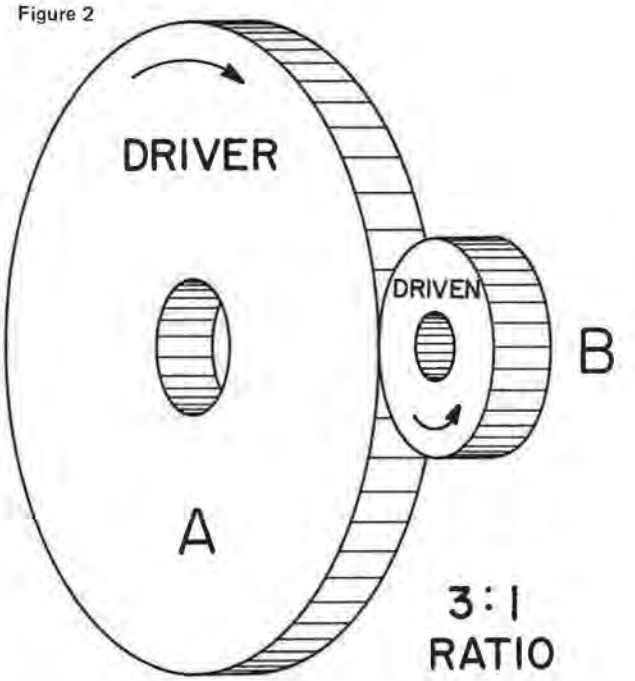
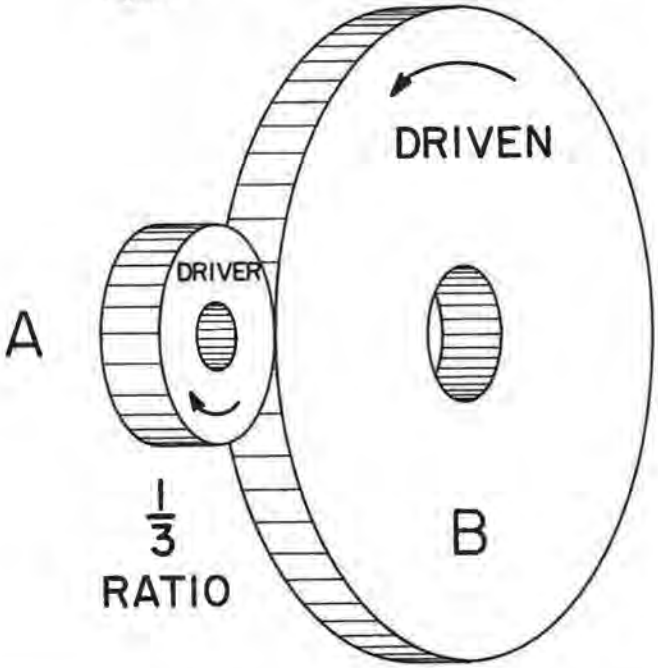


Figure 3



The diameters of discs "a" and "b" are one-third the diameters of discs A, B, and C; therefore, when disc A makes one complete revolution, disc "a" will make three revolutions, thus making a ratio of 3 to 1 between driver gear A and driven gear "a". Since disc "a" is attached to disc B, then disc B will also make 3 revolutions to one of disc A. When disc B has made three revolutions, then disc "b" with its attached disc C will have nine revolutions.

We will assign the following diameters to each disc for calculation purposes:

Disc A = 30.00mm.
Disc B = 30.00mm.
Disc a = 10.00mm.
Disc b = 10.00mm.

$$\text{Revolutions of Disc C} = \frac{30.00\text{mm} \times 30.00\text{mm}}{10.00\text{mm} \times 10.00\text{mm}} =$$

9 revolutions.

This is called a compound train and is used in this manner for the main train of watches.

STEPPED DOWN RATIO

If we were to reverse this train and make disc C the driver, then when disc C and its smaller disc make one revolution, disc B and its small disc would only make one-third of a revolution. In this case, disc A would only make .1111 revolution. Example:

$$\text{Revolutions of disc A} = \frac{10.00\text{mm} \times 10.00\text{mm}}{30.00\text{mm} \times 30.00\text{mm}} = .1111 \text{ turns.}$$

This example of gearing is used for dial trains since a stepped down ratio is needed.

CALCULATING LENGTH OF RUN

The length of run of a watch in hours is determined by the number of teeth in the barrel and the number of leaves in the center pinion (see Figure 5). For example, if the barrel has 80 teeth and the center pinion has 10 leaves, we would have:

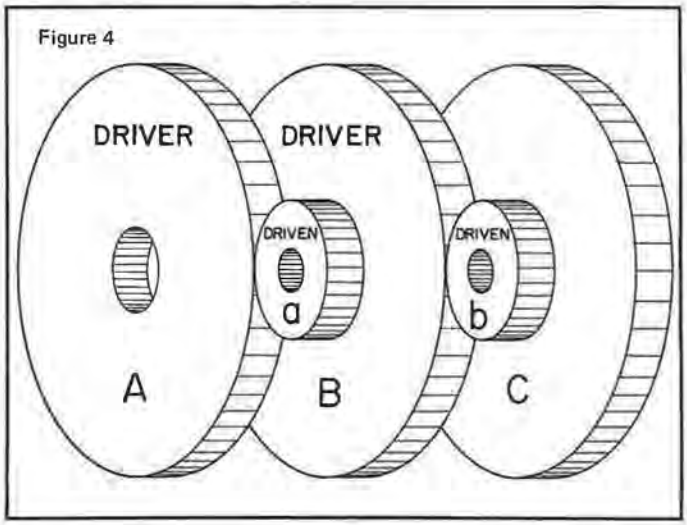
$$\text{Turns of Center Pinion} = \frac{80}{10} = 8$$

Since the center wheel turns one revolution per hour, then the watch would run 8 hours for 1 turn of the barrel. If the barrel were capable of making 5 turns on a full winding of the mainspring, then the watch would run 40 hours on a complete winding. For example:

$$\frac{\text{Turns of Barrel 5} \times \text{80 Teeth}}{\text{10 leaves}} = \text{40 hours run}$$

Any time the mainspring barrel gears directly into the center wheel pinion, then the watch is a one day timepiece. If a watch needs to run much longer than this on one

Figure 4



winding, such as for eight days, then an intermediate wheel and pinion is placed between the mainspring barrel and the center wheel to accomplish this. This system is shown in Figure 6. To illustrate this eight day system, let us say that the barrel has 80 teeth, the intermediate pinion has 10 leaves, the intermediate wheel has 60 teeth, the center wheel pinion has 10 leaves, and the mainspring barrel is capable of making five turns on one winding, then we would have:

$$\text{Hours Run} = \frac{5 \times 80 \times 60}{10 \times 10} = 240 \text{ hours.}$$

Then to calculate for the number of days run, we would have:

$$\text{Days Run} = \frac{240 \text{ hours}}{24} = 10 \text{ days}$$

This would be more than adequate for an 8-day watch.

To further illustrate how the intermediate wheel system works to increase the number of hours a timepiece will run on one winding, let us use an example of a 400-day clock. A 400-day clock has three intermediate wheels and pinions between the mainspring barrel and the center wheel pinion. To illustrate the length of run with the formula, let us say that the barrel has 80 teeth and the first intermediate pinion has 10 leaves, the first intermediate wheel has 60 teeth, the second intermediate pinion has 10 leaves, the second intermediate wheel has 60 teeth, the third intermediate pinion has 10 leaves, the third intermediate wheel has 60 teeth, the center pinion has 10 leaves, and the barrel makes 5 turns on one winding, then we would have

$$\text{Hours Run} = \frac{5 \times 80 \times 60 \times 60 \times 60}{10 \times 10 \times 10 \times 10} = 8640 \text{ hours}$$

$$\frac{8640 \text{ hours}}{24} = 360 \text{ days}$$

This is 40 days short of 400 days. Therefore, if we add only 10 teeth to the first intermediate wheel to make the clock run longer on one winding, then we would have

$$\frac{5 \times 80 \times 70 \times 60 \times 60}{10 \times 10 \times 10 \times 10} = 10{,}080 \text{ hours}$$

$$\frac{10{,}080 \text{ hours}}{24} = 420 \text{ days}$$

This would be more than adequate to run the clock for one year or 365 days on one winding.

One main disadvantage to using intermediate wheels to increase the length of run is that it takes a stronger mainspring to drive the timepiece and, when a stronger mainspring is used, the friction is increased on the first wheels in the timepiece. This increases wear and could affect the timekeeping qualities and the life of the timepiece.

In order to increase the power in some 8-day clocks, two mainspring barrels are used. When this is done, some of the extra friction is divided between the two barrels instead of being concentrated on only one barrel. This also allows for longer mainsprings to be used. Since the springs are thinner than a single spring would be, they can be made longer which would allow for a longer run on one winding.

CALCULATING VIBRATIONS PER HOUR

The numbers of teeth and leaves in the other main train wheels and pinions determine how many vibrations the balance wheel must make for the watch to keep correct time.

Figure 5

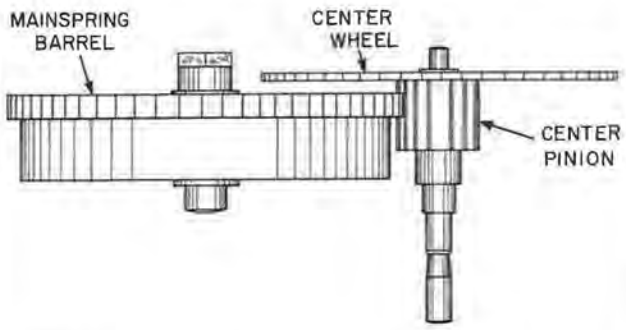


Figure 6

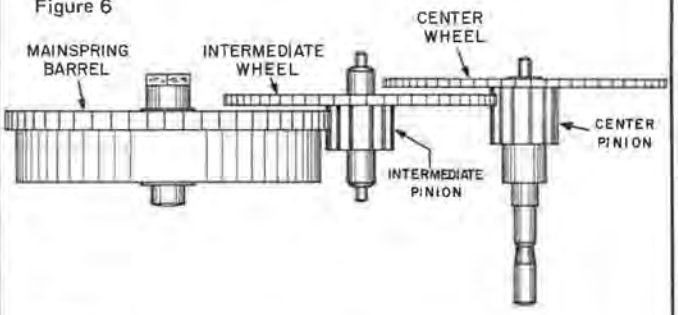
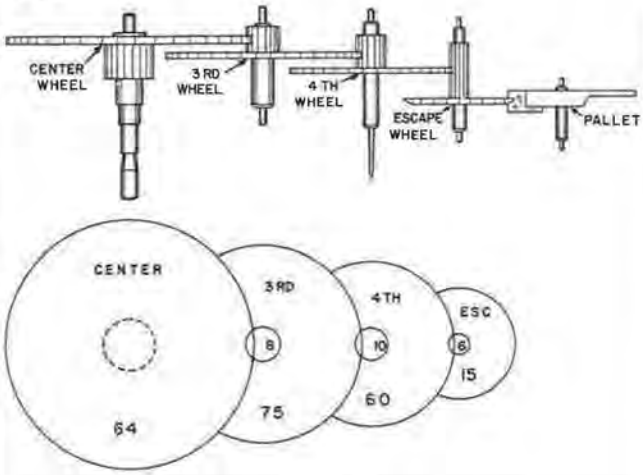


Figure 7



Note: See Figure 7 for time train layout. For example, if the center wheel has 64 teeth, the third wheel pinion has 8 leaves, the third wheel has 75 teeth, the fourth wheel pinion has 10 leaves, the fourth wheel has 60 teeth, the escape wheel pinion has 6 leaves, and the escape wheel has 15 teeth, then the following formula is used to determine the number of vibrations the balance wheel must make for the watch to keep the correct time. Note: In the formula, the escape wheel teeth are multiplied by 2 because each tooth receives two impulses, one on each pallet stone.

$$\text{Vibrations per hour} = \frac{64 \times 75 \times 60 \times 15 \times 2}{8 \times 10 \times 6} = 18{,}000$$

$$\text{Vibrations per minute} = \frac{18{,}000}{60} = 300$$

$$\text{Vibrations per second} = \frac{300}{60} = 5$$

Calculating trains will continue next month.

GEORGE LEWIS:
TEACHER WINDS UP SCC CAREER

The following article appeared in the May 1988 issue of *PACER*, Seattle Community College's newsletter.

His students and fellow faculty don't know what makes George Lewis tick, but they're filled with admiration for the quality of the time he spends on their behalf.

Lewis has taught watch and clock repair at North Seattle Community College for 18 years, dedicating himself to "a life of commitment, technical competence, intellectual curiosity and zest," says a colleague nominating him for the Burlington Northern Foundation Faculty Achievement Award.

Students gratefully detail the specifics: How Lewis bought tools and parts for needy students from his own pocket, and how he tirelessly attended professional meetings to keep up to date in the latest technology.

For Lewis, teaching didn't stop at the classroom door. One student talks about the instructor's "personal involvement," demonstrated "by his hiring me to do work around his house when I was in need of extra income."

"He taught us honor," wrote another, "and he has patience beyond time."

For Lewis, the exacting world of watch repair started out as merely the means to an end. While he spent his early career as a journeyman tool and die maker, his spirit was in gymnastics. The former Pacific Coast and All-Around Gymnastics title-holder from Roosevelt High found his athletic career cut short by Army service during World War II.

But he found that in coaching, he could continue to take part in the sport he loved. Working through the Seattle YMCA, Lewis shaped "39 national champs," he says proudly. He could still spend hours in the gym each week and participate in the thrill of Olympic meets. Searching for a job that would allow him the freedom to set his own schedule, Lewis settled on watch repair, attended Edison Technical School (now part of Seattle Central Community College), and apprenticed to the owner of The Time Shop in downtown Seattle.

Lewis, once named Seattle's Big Brother of the Year, gave up his "Y" work when he started teaching at North Seattle Community College. However, he then devoted himself to his students.

He recalls their stories one by one, as though he's turning over pages in a mental scrapbook. He remembers the music teacher who had a heart attack that took him out of the classroom, the students who were deaf, and those who were in wheelchairs. Lewis pauses at the memory of several Vietnam veterans, for whom he feels a special kinship, "maybe because I'm a former Army sergeant."

"An advantage of this trade is that all students, highly skilled or not so skilled, can find employment," Lewis says. "They can find jobs that call for varying levels. There's room for all of 'em."

Teaching seems to come naturally to Lewis, who at 68 is winding up his career in 1988. "Primarily, I think, enthusiasm is the key," he says thoughtfully.

Since 1971, George Lewis' first year at North Seattle Community College, "Many, many students have passed under the guiding hand of this remarkable man," writes a former student who is now a successful businessman.

"Reading a list of past students is reading a list of friends of George Lewis, because his teaching never stops. After all these years, if I have a problem, I can call George and there he is with his ready smile and a helping hand. George Lewis is the heart of watch repair for many of us."

CRAFTSMAN'S CORNER

By Bert Dawson

Electroplating For a Jewelry Store Part II

NICKEL PLATING

Nickel plating is done the same way as rhodium plating but takes a little longer if you want a thick, dense coating. A thin flash coating can be done in a few seconds at six volts. For a thick coating use two volts for a few minutes, depending on how thick a coating is needed. If you want a bright finish, it may have to be polished after plating and then flash plated. A stainless steel or a nickel anode should be used. If left in the solution for a long time the anodes may have to be cleaned before further use. Solutions should be used at room temperature. After use remove the electrode from the solution and wash it. Keep it in a clean place. Cover the solution and keep everything clean.

Nickel plating is tricky to do and is not recommended for occasional use in a jewelry store repair shop. To underplate, gold plating is best for a small shop.

GOLD PLATING

Gold plating is the easiest of all to do. The solution is a cyanide solution and should be used with care. As with all plating, the piece to be plated must be polished and clean before plating. Fourteen karat yellow-gold plating solution is most often used in the repair shop. Other gold content solutions and several colors can be obtained from the suppliers. A stainless steel or gold anode should be used. If a gold anode is used the solution will last much longer. After use, the anode should be removed from the solution, rinsed in water, and kept in a clean place.

Plating only takes a few seconds at four to six volts, depending on the size of the job. The solution works quite well at room temperature, but for best results heat the solution to 130 to 160 degrees F. Gold plating goes on very thin. If a thicker coating is needed, the piece being plated should be rubbed with damp baking soda to polish it a little; then plate again. Polishing with the polishing wheel would cut through the thin gold plating. For an even color and a longer lasting finish, all white colored metals should be copper plated before gold plating.

COPPER PLATING

On jewelry, copper plating is mainly used as an undercoat for other plating such as rhodium, gold or silver or to cover up soft solder. Only a thin flash coating is needed. Stainless steel anodes are best for the jeweler to use, as copper anodes are hard to keep clean with occasional use in a small repair shop. The solution is inexpensive and can easily be replaced when exhausted or contaminated. Use a 600 ml beaker as shown in Figure 1 to hold the solution. A few seconds at six volts will plate most jobs. Plating can be done at room temperature but 120 to 150 degrees F works best. When through plating, remove the anode from the solution and wash it in water. This solution is also a cyanide solution and care should be taken when using it. Keep it covered when not in use to prevent evaporation and contamination.

SILVER PLATING

Silver plating solution is also a cyanide solution. A stainless steel or silver anode should be used. A silver anode is recommended as the solution lasts longer. It is more expensive than copper solution. When through plating, wash the anode and store it in a clean place. The plating solution works well at room temperature, but should be at least 70 degrees F and not over 85 degrees F. When plating at two to four volts the plating will be quite bright and dense but takes five to ten minutes depending on the size of the piece being plated.

A faster and very good plating can be done at five or six volts. After a few seconds the piece being plated turns a nice ivory color. When it starts to turn brownish at the edges, remove it from the solution, wash it in water, and then rub it with a piece of very fine steel wool while running water over it. This will bring back the silver color. If a heavier coating is wanted, repeat the above process as many times as needed. Do not let the piece become brown while plating as this forms a loose, spongy coating that will wipe right off. If the piece turns brown, reclean and remove the plating, reduce the voltage, and start over. After using steel wool

Figure 1

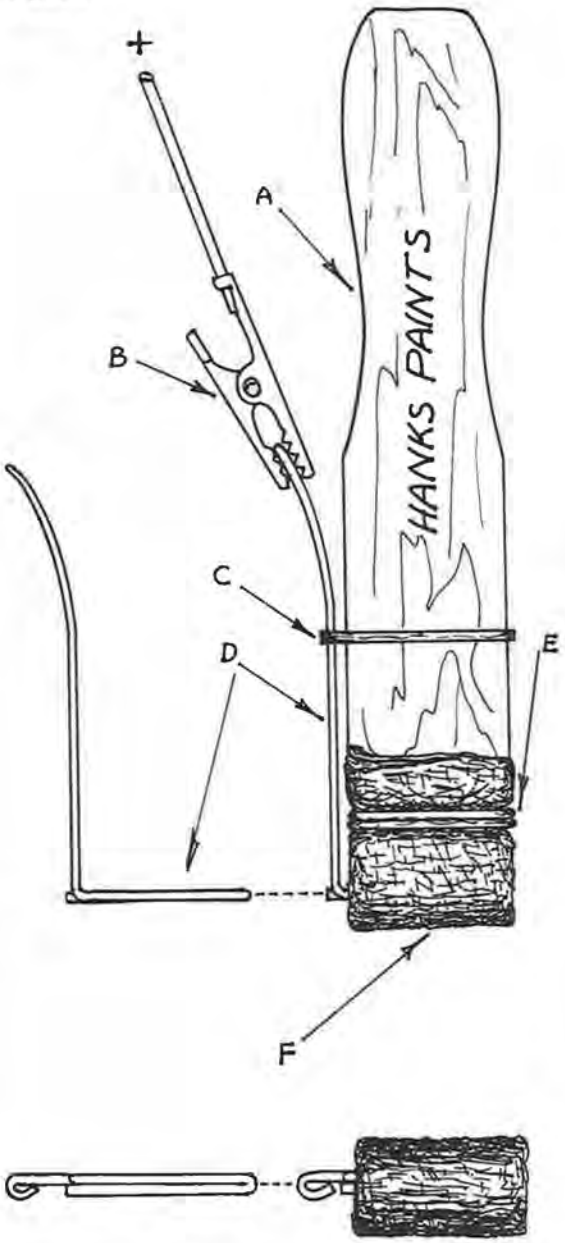
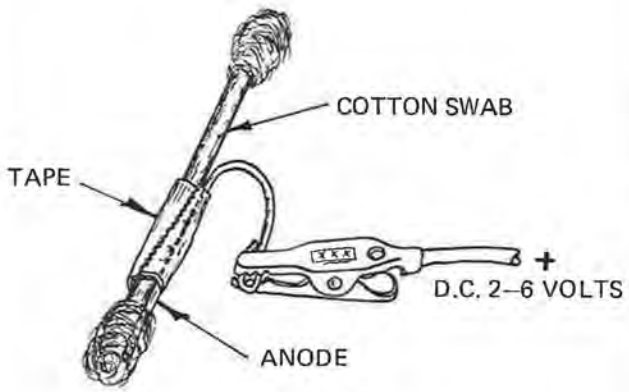


Figure 2



the last time, dry the piece and polish it with the polishing machine since silver goes on very thick.

SPOT PLATING

Spot plating can be done on a large piece, such as a coffee server or tray. Use a camel hair brush or a piece of felt or a cloth wrapped around the end of a stick with a piece of silver imbedded in it as an anode. The anode must not touch the piece being plated. Dip the brush in the solution and brush back and forth over the spot to be plated. Blending the edges of the plating is done by not stopping the brush strokes in the same place, as a line will show. Use 6 volts D.C. for brush plating silver. After plating, rub with very fine steel wool and water. Polish with a piece of cloth that has been charged with tripoli. Finish by polishing the whole piece with silver polish.

Spot plating brushes should be washed after use and stored in a clean place. Spot plating brushes can be bought from a supplier or made similar to the sketches shown: A - a flat wood stick, B - anode clip, C - rubber band, D - silver wire anode, E - rubber band or string, and F - piece of terry cloth towel or felt.

BULOVA CLOCKS PRESENTED TO "MOSCOW SUMMIT" STAFF

President Ronald Reagan presented Bulova "International II" Clocks to the 20 members of the "Official White House Summit Staff" as a memento of their involvement with the Reagan/Gorbachev meeting.

Selected by the White House, each walnut-finished solid wood clock has a precise quartz movement and an International dial listing the major cities throughout the world. The clock top has an engraved brass plate bearing the Presidential Seal, Ronald Reagan's signature, plus the inscription:

THE MOSCOW SUMMIT
MAY 29 - JUNE 2, 1988

THE PICKLE BARREL

Marshall F. Richmond, CMW

JEWELRY FINDINGS

Part 1

Repairing jewelry, operating a jewelry store, or hand crafting jewelry, jewelry findings play an important part in successfully servicing your customers. Most any component or attachment to jewelry is considered as findings. Fine jewelry can be made up entirely from findings. Although we probably think of findings as spring rings, jump rings, pendant loops (bails), or catches, many more things are considered findings. Ring shanks, bezels, heads, sides, earring settings, stone settings, pinstems, safety catches, and almost any part of a piece of jewelry that can be bought separately are considered findings. Some findings catalogs even list stones for replacement.

Even though the term "findings" covers a very broad field of jewelry parts, there are a few items that are more often used and should be stocked by even the smallest business dealing in any way with jewelry.

Jump rings are probably the most used of all findings. These can be bought in graduated assortments in karat gold, gold filled, or sterling silver. They are available in round or oval, and the oval has the split on the side. The split in the round often comes open slightly letting the chain or attached piece come out. Usually this is caused by using too light a gauge metal for the diameter of the ring so a heavier ring should be installed or the split hard soldered to keep it from happening again.

Another stop gap method that will strengthen it is to use a pair of chain nose pliers and reshape the round ring to an oval leaving the opening on the side of the oval. As many times the openings to be connected are too small to use a heavier gauge ring, making it oval will give it more strength. Some jump rings have beveled ends, so they will lap together when closed which will lessen the chance of coming disconnected. However, the square butt ends when closed properly make a perfect—almost invisible—crack, and a much nicer job.

Although jump rings are open, there is more reason behind it being open than just for the convenience of installing or repairing. It's been said many times that a chain is no stronger than its weakest link, and it is the same with the jump ring. If the jump ring is the weakest link it will separate before the chain breaks, probably in the middle, which makes for a difficult or costly repair. On extra heavy neck chains, I would not weld a ring in the ends making an endless chain because some of these chains are heavy enough to use as a tow chain. If there is no weak link someone could possibly be caused serious injury—even to hanging themselves accidentally. Although I do have a 48-bottle cabinet of jump rings containing oval and round in gold filled or silver, I often make my own jump rings, especially if they need to be made of karat gold.

To make jump rings, wire that is the diameter of the material needed for the proper weight ring can be wrapped around a piece of rod the diameter of the hole needed in the ring. One wrap will make one jump ring, two wraps will make two, etc. Manufactured jump rings are made with wire from B & S gauges 16 to 26. The larger the number the smaller the diameter of the wire. After the wraps are completed, use a jewelers saw and saw them square across each coil. Sawing them will leave the ends square with the wire and when put together will fit perfectly. If cutting pliers or shears are used, the ends usually are pointed and do not fit together well. No doubt oval rods can be purchased somewhere to be used to make oval rings, but it takes but a few minutes to file a round rod to an oval shape about an inch from the end, allowing several wraps of the wire to make oval rings. The other alternative is to squeeze the round rings into an oval with a pair of pliers, leaving the opening on the long arc of the oval. Many jump ring repairs are made while the customer waits since it is a very simple repair, and most any jewelry store

clerk is capable of making jump ring repairs. However, there is usually a noticeable difference in these repairs compared with the installation done by an experienced jewelry craftsman. Even on new jewelry where the jump rings are installed in a factory, some show very sloppy workmanship. I have observed some out of shape, and on some the ends were not tightly closed leaving a good chance for the jewelry to come apart where connected with the jump ring. Almost all neck chains use a jump ring to connect the chain to the catch.

In the last few decades many new neck chains come with a small bar, drilled on each end. Usually on one end the hole is larger for the spring ring catch to fasten to while the smaller is attached to the end of the chain with a jump ring. These are listed in the findings catalogs as chain tags. They do make it easier to hold while attaching the spring ring catch. Jump rings are used for attaching sister hooks, box catches, spring rings, or most any catch to chains. They are also used to make a loop to fasten the catch to if chain tags are not used.

The best way that I have found to fasten jump rings is by using two pair of chain nose pliers, one pair in each hand. Instead of spreading the crack, the ring is gripped on each side with the pliers with the split up, twisting enough to open the split. The attachments are hooked while holding with one pair of pliers. Then, again gripping the ring with both pairs of pliers, the ring is again twisted back until the ends meet, and they are tight and aligned so the crack is only noticeable under magnification. Of course, I have to do the whole operation under magnification on small jump rings. It's doubtful if many people have good enough eyesight to do this with the naked eye and obtain perfect alignment. This may account for some of the sloppy jobs that I previously referred to, for they may have been done without magnification.

It might be wise to compare costs on manufactured jump rings and making your own. One particular size listed in the findings catalog is priced at $23.95 per dozen. Eight inches of this size wire costs me $12.97 and will make 16 jump rings this size, making the cost of material 81¢ per ring or $9.72 per dozen. This means that for your time you would save or make $14.23. It will take no longer than 10 to 15 minutes to make these, so an hourly wage could be from $56.92 to $85.38. It appears to me that it would be profitable to make 14K jump rings. I never made a comparison on gold filled or sterling silver as I use these from my material cabinet.

Soldering jump rings in the joints gives them much more strength, but it is a matter of judgement to determine if this is at all necessary on each individual job. In hard soldering gold or silver jump rings the purpose of the split ring could be defeated because it will no longer be the weakest link. So when breakage occurs it will in all probability be in the catch or somewhere in the chain itself, which makes the repair more difficult and more costly to the customer. Jump rings used to attach charms can be made of heavy gauge wire—even as heavy as 13 gauge. By using a heavy jump ring for charms it is not really necessary to weld or solder the split, but many people buy expensive charms and request that they be soldered to lessen the chance of losing them should they get caught on something. Many jewelers in retail stores are merely using soft solder with a soldering iron to solder these rings attaching charms. This is fine, but adds very little strength. It is adequate if a heavy enough jump ring is used because it makes the customer feel more secure. Hard soldering makes the most effective job as hard solder will make the ring almost as strong as a seamless ring.

The only time that I resort to soft solder with a soldering iron is when attaching pewter (pot metal). These charms are rhodium or gold plated and give the appearance of gold or silver charms, but when using heat to hard solder the jump ring the ring on the charm for attaching will usually melt. I have had this happen on more than one occasion. When it did happen I soldered a silver or gold filled jump ring to form a new eye with soft solder and applied with a soldering iron.

The best way that I have found to solder jump rings is to cut a small square of solder, insert it in the split by opening it slightly, and forcing the solder between the ends. The square of solder should be just large enough for the corners to protrude slightly. Flux and apply heat until the solder flows and when polished it cannot be distinguished from a seamless ring. On very fine jump rings this is too difficult to do, so with the new paste solder and flux mixture that comes in a hypo needle a little of this paste applied to the split and heated will produce a very smooth solder joint. The paste solder is available in white or yellow gold and one unit costs about the same as a pennyweight of regular gold solder. As the paste is the flux, the application of the solder and the flux is done at the same time. There is no need to fool around with a flux brush or an applicator. Pendant loops or bails are widely used to connect a pendant or locket to a chain. It slides easily on the chain and makes a very attractive attachment, but an oval jump ring will perform the same function. Plus, it is much less expensive to make or buy, and since the pendant is the accented subject it is hardly noticed.

Making a bail is relatively simple and many styles can be made from a narrow strip of karat gold, gold filled, or silver—depending on the quality needed to match the pendant and chain. It doesn't take a genius to look at a bail or a picture in a catalog and duplicate it. Medals, pendants, and charms usually have a fixed ring from which they suspend. These rings get worn very thin, even completely open, yet these are also repairs that are profitable and quite simple. The old ring can be filed off and a jump ring can be hard soldered in its place. The excess solder (if any) can be filed off then polished so it is almost impossible to see where a repair was made.

In making this repair the same rule applies as in ring sizing. If stones or enamelling are involved it should be determined to what extent they will take heat. Stones that will not stand heat should be shielded or removed before the heat application is made. On all metal pieces it is wise to use boric acid and alcohol and burn it off to leave the protective anti-oxidizing coating, saving some time on the clean-up and polishing operation. There are some lockets and pendants that need this repair and it is not practical to remove the stones for hard soldering replacement. Some of these can be repaired by making a loop or bail from flat metal in a "U" shape and drilling the ends. Also drill the pendant close to the edge where the worn-out loop was removed. This can then be riveted to the pendant. If the bail or loop was shaped attractively, you will have a very nice looking as well as a long-lasting repair. In making repairs of this type, always evaluate the problems that can arise from heat application and if it appears that damage could be done or an extra expenditure of time caused, then try to use other methods such as rivets.

In making small, quick repairs it is necessary to have a few good tools: two pair of chain nose pliers, one pair of flat nose pliers, one pair of round nose pliers, and work tweezers which do not have to have very fine points so the points close tightly and are of the same length.

In the next article we will discuss spring rings and other fastening devices that are findings.

By A. G. Simon

UNDERSTANDING THE PENDULUM CLOCK

Part 6

Adapted from the AWI correspondence course in clock repair.

As we previously mentioned, unless the clock or watchmaker is going to need more than an occasional replacement wheel, it really isn't mandatory that the subject of wheel cutting be fully mastered. When that occasional custom cut wheel is required, most craftsmen turn to specialists for their custom wheels rather than make the investment in the equipment required to do the job. It will help the craftsman, however, to have a basic understanding of how wheels are cut so that s/he will be able to understand the literature on the subject and converse intelligently on the subject with peers, laymen, and wheel cutting specialists. For this reason we will present an overview of the process and recommend that those who plan to actually cut their own wheels do additional reading and study on the subject.

One form of wheel cutter is shown in Figure 1. The cutter shown in 1a is a cutter which makes a square-bottom cut; the cutter shown in 1b makes a round bottom cut. These cutters are made of discs of tool steel which are turned to the shape of the tooth space they are to make. Then they are ratchet-milled to form the saw-like teeth shown in the illustrations. The cutters are hardened in oil and tempered to a pale straw color. Such a cutter is used in the same manner as a circular saw which it in fact really is when run at high speed.

Another form of wheel cutter is shown in Figure 2. This is known as a "fly cutter." It is made of round or square tool steel rod. The end is turned to match the profiles of the tooth space it is to cut. The fly cutter is then hardened in oil and tempered to a pale straw color. After being heat treated, one-half of the turned section is ground off, thus producing a sharp cutting face. The contour of the cutting face is the shape of the space between two teeth including the curves up to their ends. Such a cutter is held in a hole in a disc, and is secured in place by a set screw as shown in the drawing in Figure 2. This cutter is also operated at very high speed.

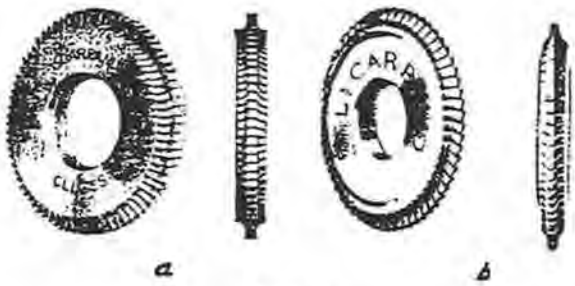


Figure 1

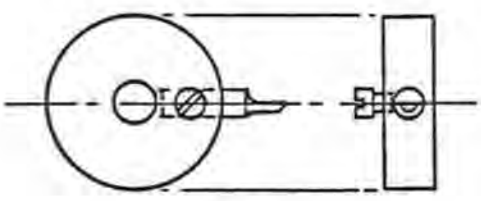


Figure 2

Figure 3 shows the setup of the tools required for wheel cutting. This certainly is not the only arrangement one can use to cut wheels, but it is a very traditional one. Figure 3 shows the wheel cutter, spindle and frame which are fastened onto the slide rest (b). The slide rest is placed on the saddle of the lathe (c). The base (d) has a "T"-groove that fits over a "T"-headed bolt (e) which is tightened by a thumb nut under the bed of the lathe. These tools may be set up from the front of the lathe as shown in this illustration, or from the back of the lathe.

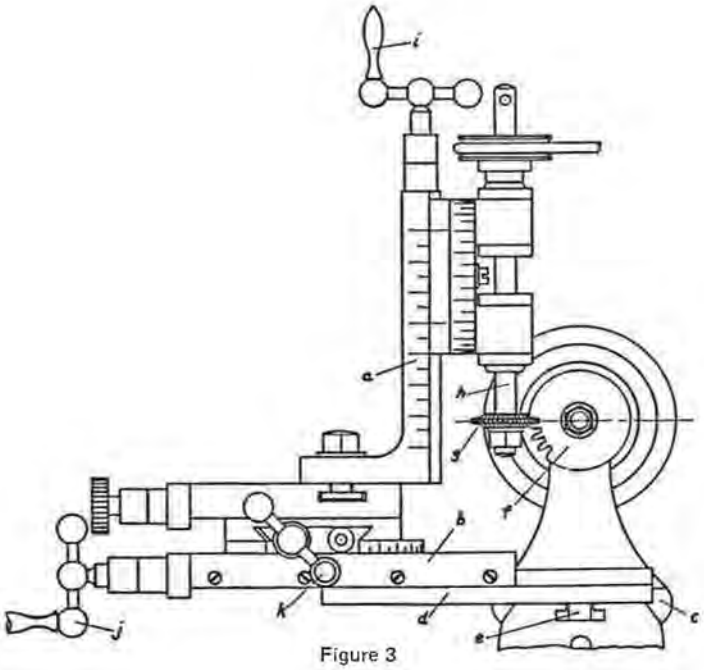


Figure 3

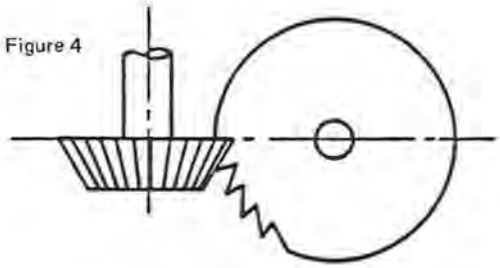


Figure 4

The wheel blank (f) is placed on a wheel chuck which is held in the spindle of the lathe. The number of teeth to be cut may be indexed from the pulley of the lathe which has a series of 60 holes equally spaced in the metal ring. These holes are imbedded in the large pulley, or on an index plate which is fastened to the rear of the lathe's spindle.

A pulley index having 60 holes can be used to cut 60, 30, 20, 15, 12, 10, or 6 evenly divided teeth. A locking pin is provided to lock the pulley and the wheel blank firmly in place for each cut.

To cut 60 teeth, the pulley would be indexed from hole to hole, thus using all of the holes. If 30 teeth were to be cut, the pulley would be indexed by placing the pin in every other hole. If 20 teeth were to be cut, the pin would be placed in every third hole, etc.

For cutting ranges of teeth which are not covered by the pulley, an index plate is used. This plate is a disc having a series of holes or notches spaced evenly around the circumference of the disc. It is fastened to the rear of the lathe's spindle and latched in successive positions by a latch-spring which is fastened to the bed of the lathe. The cutter (g) is placed on the spindle (h) of the wheel cutter. The pulley which is belted to a large wheel called a "speed wheel" is mounted on a counter-shaft. The motor should be from 1/12 to 1/10 horsepower and have a speed from 1200 to 1750 revolutions per minute.

The cutter is adjusted up or down by turning the lever (i) of the wheel cutter in the proper direction. It is adjusted laterally by turning the lever (j) of the slide rest. The cutter is first adjusted by the slide rest to just clear the edge of the wheel blank, and then adjusted by the wheel cutter lever to a line running through the center of rotation of the lathe spindle and parallel to the bed of the lathe. This is shown by the center line in Figure 3. Note that the flanks of the teeth cut will be radial with the center of the wheel.

When the adjustments to the cutter have been made, the motor is started, and with the cutter spindle rotating at high speed, the cutter is gradually fed into the wheel blank by turning the lever (j) of the slide rest. After cutting one space the cutter may be withdrawn from the wheel blank. The blank is then indexed for the next cut and the next cut is made by feeding the cutter to the blank by the lever (k). A combination of those movements of the cutter in with lever (j) and laterally with lever (k) will be required for cutting thick wheels, and a number of cuts will be made laterally.

In pinion cutting, a rod of steel having the diameter of the pinion to be cut is placed in a chuck. The length of the arbor and the position of the leaf section is marked, and the pinion blank is turned. One end of the arbor is then turned to a point that is truly centered with the blank. The blank is now placed in a chuck which closely fits the arbor. The pointed end is held in a female center-taper which is held in the spindle or runner of the tail stock of the lathe so that it will have no side play in the center. This point should be lubricated with a drop of oil. The operation of cutting the spaces of the pinion is the same as for cutting wheel teeth.

Wheel cutters of the kind shown in Figure 1 can be bought in assortments of sizes, and index plates can be readily obtained. Fly cutters can be easily made, and are often used by the infrequent wheel and pinion cutter.

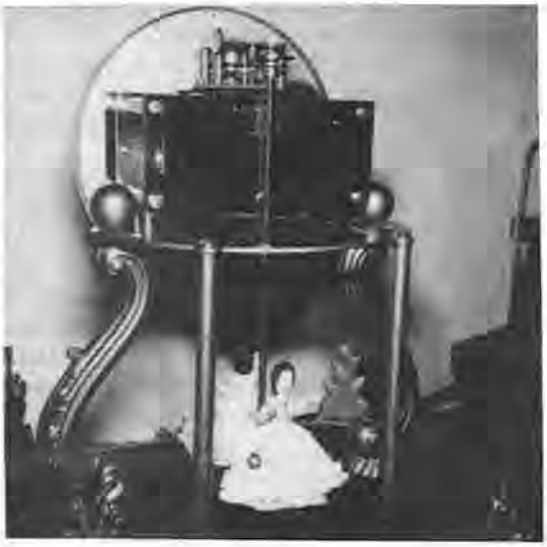
To cut ratchet wheels, the cutter is adjusted to the position shown in Figure 4, and a milling cutter of the shape shown in Figure 4 is used. These cutters can also be obtained in an assortment of sizes and angles for cutting. In cutting a ratchet-toothed escape wheel, such as those used in clocks, cutters of this or similar shape are used. For cutting an escape wheel having club-teeth, several specially shaped cutters of the fly variety are used. These are fed into the blanks at the angles required to produce the tooth faces and tooth ends.

BULLETIN BOARD

A. NEW REQUESTS

CUSTOM-MADE WATCH MAINSPRINGS
Several requests in recent weeks dealt with individuals who were restoring older watches and who found the need to replace a rather odd sized watch mainspring. The "Bulletin Board" would like to develop a source list of individuals or firms who will custom make watch mainsprings.

DANCING GIRL CLOCKS
Another item for which we have been receiving requests in recent weeks involves a variety of dancing girl clocks which are made in Germany. Most seem to be made by the firm identified as W. & A. Schmid-Schlenker, Jr. of Bad-Duerrheim, Germany. A typical clock is pictured below. Members are seeking a U.S. source for spare parts as well as service instructions. Requests to the manufacturer have gone unanswered to date. If you can supply any information, the "Bulletin Board" will pass it on to interested members.



B. RESPONSES

CLEMENT LATHE COMPANY COURSE
Not all responses are as positive as we would hope they would be–Jacob Hess of Freeport, IL writes:

> I have all 78 pages of Clement's "25 Lessons in Watchmaking." All of his equipment and much WW too. I purchased it in 1927. I paid dearly for it! Your Fresno member wants it for free? He will get more out of it than your $250 Lathe Seminar.

GRAPHITE IN GOING BARREL
Dwight Thurston writes from Collinsville, CT:

> As for graphite in Chelsea mainspring barrels, Chelsea's own "Illustrated Parts List" for their 4L movement says: "a light dusting of this powdered lubricant on the mainspring is sufficient, to which is added 4-5 drops of Moebius #4 clock oil." The powdered lubricant they list is Molycote Z (Dow Corning). To this let me add my own opinion–they're out of their minds! What do they have against using a good mainspring oil? I've had fine results for years with Keystone mainspring oil, and I've never found anything but a gooey mess and lots of trouble inside barrels with graphite inside. Next question: what is Molycote Z?

Mr. Thurston also named the source we recently learned about for some Herschede clock parts and also named a source for sales and service of Floral Clocks.

HAMILTON ELECTRIC WATCH IDENTIFICATION
No other "Bulletin Board" topic brought more mail than this Hamilton request; many offered help, many asked to be put on the list for information. The most complete line of identification came from reader Richard Kowlaski of Fort Wayne, IN. Our thanks to Mr. Kowlaski and the others who contributed bits of information. We are reproducing Mr. Kowlaski's contribution at the end of this article as a service to our collector readers.

C. ITEMS STILL NEEDED

BLACK OXIDIZED FINISH
A Daytona, Florida member seeks to find a way to darken silver chemically. He wants to apply the finish to silver plaques which are two dimensional. The raised part of the plaque is bright polished; the recessed background part of the plaque is what he would like to have a darkened (oxidized) background.

We are aware of the Vigor product "Oxy-Black" which is electroplated onto the piece. We have seen applications that spray onto items such as class rings to present that black oxidized finish. Are there any other products or methods that might be better to use for this kind of finish on plaques?

SQUEAKY CLEAN?
In recent weeks we have had two requests for help because the clock pendulums involved squeak. One involves a cuckoo clock, the other a Chelsea No. 3 regulator wall clock. In both instances all parts relating to the pendulum have been polished and the pendulum bob is secure on the pendulum rod. We would welcome suggestions about possible cause and solutions for one or both of these clocks.

MACOMB CALENDAR CLOCK COMPANY
AWI member Jarrel Hofer, Macomb, IL is in the process of writing the history of the Macomb Calendar Clock Company. He would welcome any information readers would be willing to share with him. In addition to history, he is interested in case styles. Send your responses to the "Bulletin Board" at AWI Central.

FOREIGN MAKER?
We are trying to identify the movement shown here. None of the references we have on hand show the exact same move-

ment, although several Waterbury movements come close. Henry Fried indicates that it may have been made in Japan after the turn of the century when they imitated Connecticut-made movements for their domestic market. In recent years a number of these movements have been known to have entered the U.S. collectors' market. If you can make a positive identification, please contact AWI Central.

DO YOU HAVE INFORMATION REGARDING THIS MONTH'S REQUESTS?

If so, please contact the "Bulletin Board" at the address at right

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
3700 Harrison Avenue
Cincinnati, Ohio 45211

Thank You!

Affiliate Chapter Column

Thomas H. White

The Catfish on the Platter

Arizona is the "Land of Dry Rivers" most of the time—bridges with just sand, cows that give little milk, and mountains with no trees.

I left a countryside of trees and undergrowth you could hardly walk through, and everything was green. The hills were many and some were mighty steep. The rivers had water in them all year long, sometimes flooding. It was a new life for us. I learned to love the hot and dry desert, and after a time, the mountain ranges became more beautiful.

I worked for a couple of years at a few different jobs selling stocks and autos. Remember, I left West Virginia and a jewelry store that we started from nothing. Having just graduated from Western Pennsylvania Horological School, the fact was watchmakers were a "dime a dozen," so to speak.

My next job was a Zanjero (waterman) for an irrigation project. Remember, in Arizona we only receive approximately seven inches of rain per year. Irrigation is a new way of life. The run-off water in the mountains would flow into dams. Then as it is needed it would flow through rivers and canals. The water is released in "specified amounts" to be delivered to the farmers in order to grow cotton, vegetables, and feed for animals.

Being new on the job, I was given the night shift. My job consisted of directing water into small ditches so the farmers could water their crops. On one particular night when no one else was around, I suddenly heard a lot of noise—then realized that I was the only one in that place. It didn't take me long to run to the truck for protection!

After a while I got my nerve back, and with a large flashlight, I started back to finish the job. There it was—a *big catfish* splashing in shallow water. I never dreamed a catfish could frighten me as much as that one did! This night still lives in my memory. Where did this fish originate? In the river? From one of the several dams? Or maybe from the canal? Wherever it came from really doesn't matter, for the big fish served a good purpose and ended *on my platter*!

This reminds me that the work we put into programs such as when we hold an office in the guilds or work we do for our state conventions or AWI takes a lot ot time, energy, and money. There are times you think it is a waste of time.

This past year Arizona has emphasized CELLS for the E.L.M. Trust Fund at every meeting. The response has been surprising! The great State of Arizona has come up with better than 60 pounds of cells and $165.00 donated from our members when we held our state convention! I'm so proud of the two smalls groups or guilds within our state. There is harmony and unity within groups of people who pull together as a team! *This "big fish" ended up on E.L.M. Trust Fund platter for their budget!*

TWB

NEWS ...from all around the ASSOCIATION...

NEW YORK

At a recent meeting of the Horological Society of New York, Charles Sauter gave a talk on "A World View of Watch and Clock Production Facilities." Charles is a member of the Horological Society of New York and a former contributor to the *Loupe*.

His talk provided a world view of horological production facilities with emphasis on watch production. Beginning with the mid-seventies and the predominance of electronic watches, he described the decline of U.S. production and its effect on National Semiconductor, Microma, Fairchild, Texas Instrument, Bulova, etc.

In his description of current facilities, he began with the assembly plants that are located in Mexico, Virgin Islands, Malayasia, etc. He then described the watch factories in Germany, France, Switzerland, and Japan (exporting countries), and Russia, China, and India (basically non-exporting countries).

A surprise was that a watch production center operates in Brazil and another surprise was the extent of Timex operations. It has production facilities in the U.S., Germany, Thailand, Philippines, and other parts of the world.

The Horological Society of New York recently elected a new slate of officers for 1988 (left to right). Front row: Ted Fishkow, vice president and financial secretary; Al Rudnick, president and executive secretary; Dan Richter, sgt-at-arms. 2nd row: George Gibson, recording secretary; Paul Homburger, Jack Schecter, Mort Silver, and Frank Carpathia, executive committee. 3rd row: Dan Gaegner, trustee; Bernhard Stoeber, Dennis Tricarico, and Henry Loeser, executive committee. Not shown are Harry Fisher, editor of the Loupe; Ben Matz and Howard Levy, executive committee.

WISCONSIN

The Wisconsin Horological Society's 53rd Annual Convention was held on April 29, 30 and May 1 in Oshkosh, WI. The program had Jed Block from Jewelers Mutual Insurance Co., Ken Leeseberg on clocks, Allan Smiles on casting, and Bill Biederman with news from AWI.

Jed Block showed a Jewelers Mutual burglary film, which is a must for all jewelers to see. Jewelers Mutual has two other excellent films which are available by calling 1-800-558-6411.

Ken Leeseberg brought with him about 20 clocks and pointed out different little problems he has experienced with them and how he has solved the problems. Ken owns a service shop in Montello, WI.

Allan Smiles gave an informative presentation on his setup for jewelry casting. Allan owns a jewelry store in Ashland, WI.

At the banquet, AWI President Bill Biederman gave a short talk on what's new at AWI.

Pictured, left to right, are LaDonna Biederman, Donna Gardner, Bill Biederman, and Steve McCann. In the foreground is Chuck Bunkelmann.

CANADA

The Ontario Watchmakers Association held their 51st Annual Members Meeting and Presidents Banquet at Loews Westbury Hotel, Toronto, Ontario, Canada on Sunday, May 1, 1988.

At the morning business meeting the members elected the officers to represent them for the 1988-1989 term of office. They are: President David C. Azoulay, CMW; 1st Vice President Stewart Gold; 2nd Vice President Daniel Benson, CMW; 3rd Vice President Nancy A. Hill; Secretary Robert Phillip, CMW; Treasurer Masawo Murakami, CMW; and Immediate Past President Michael Cosby.

UPCOMING CONVENTIONS

Watchmakers Association of Ohio Convention
July 22-24, 1988
Parke University Motel – Columbus, OH

Nebraska & South Dakota Jewelers Association
83rd Annual Convention
August 26-28, 1988
Midtown Holiday Inn – Grand Island

Iowa Jewelers & Watchmakers Association
Convention & Trade Show
September 10-11, 1988
Airport Hilton Inn – Des Moines, IA

New York State Watchmakers' Association
50th Annual Convention
September 30-October 2, 1988
The Hilton–Binghamton, NY

Illinois Watchmakers Convention
October 14-16, 1988
Jumers Castle Lodge–Peoria, IL

Ontario Watchmakers Association's officers for 1988-89 (left to right): Nancy Hill, David Azoulay, Michael Cosby, Stewart Gold, and Daniel Benson.

Director David Barthau, chairman of the Quarter Century Club, presents Stan Cripps (left) and Gordon Jones (right) with membership in the Quarter Century Club of the Ontario Watchmakers Association.

New Products and Literature

AMERICAN PERFIT'S VIDEO ON GLASS CRYSTAL FITTING

The American Perfit Crystal Corporation is introducing a 25-minute video tape, "Welcome to the World of Glass Watch Crystal Fitting." Complete with written instructions, it provides a realistic approach to glass crystal fitting for the watchmaker. It is available now from all watch material wholesalers.

CAS-KER INTRODUCES NEW WATCH CASE FILLER

"SPEEDI-FIT" Watch Case Filler is used to fill voids in cases when retrofitting new movements into an old watch. Base and catalyst are putty-like materials which cure in 5 to 7 minutes. The mixed material is pushed into the case back and a scrap movement is pushed into place where the new movement will fit. Each kit includes 100 grams each of base and catalyst, mixing scoops, and instructions. It provides enough material for 25 to 50 movements. The price is $22.50 per kit.

Contact: **Cas-Ker Co., 2121 Spring Grove Avenue, Cincinnati, OH 45214; (513) 241-7073.**

CATALOG OF WATCH MOVEMENT CALIBERS FROM ETA INDUSTRIES

A new catalog covering mechanical and quartz calibers from ETA and Ebauches—current through 1987—is now available. This indispensible reference source for watchmakers and jewelers is updated regularly free of charge. All text matter is in English, French, and German. The catalog costs $50.00.

Also available from ETA is an illustrated, eight-language dictionary of horological terms. All references are covered in English, French, German, Spanish, Italian, Russian, Portuguese, and Japanese. Cost of the dictionary is $62.50.

The catalog of calibers and the dictionary can be ordered from **ETA Industries, Inc., 35 E. 21st St., New York, NY 10010.** Payment must accompany order. For more information about these reference works, contact: **Urban Falk, (212) 505-5340.**

FINDINGS: "HOW TO" GUIDES FROM BATT-TRONIC

To assist the retailer in service after the sale, Batt-Tronic has developed a series of simple and easy instruction booklets for proper findings replacement. The guides feature step-by-step illustrated instructions and are available for spring bars, jump rings, spring rings, ring guards, and split rings. Retailers consider them an excellent training tool for new employees. Readers of this magazine may obtain a set of guides by writing to: **Batt-Tronic Corp., Dept. F, P.O. Box 10, Orangeburg, NY 10962.**

BULOVA EXPANDS ITS COLLECTIBLE CLOCK SERIES

Bulova has introduced five new miniaturized replicas of world-famous clock deisgns, including three Grandfather models, to its Bulova Collectibles series for the Fall '88 selling season.

These tiny treasures in time, all with precise quartz movements, are superbly crafted of solid brass. Authentic in every detail, they are traditionally styled with regal black Roman numerals and sweep second hands on stark white dials. Individually packaged in their own grey velvet and satin-lined boxes, these miniature Bulova Collectibles are ideal for all gift occasions.

The three Grandfather models have a suggested retail of $175.00 each; the two smaller clocks retail for $89.95 each, as do the five Bulova Miniature Collectible Clocks introduced in 1986. The models shown are (left to right): "New Castle" B0552; "Whitfield" B0507; "Canterbury" B0550; "Courrier" B0506; "Britannia" B0551.

For more information contact: **Clock Division, Bulova Corp., One Bulova Ave., Woodside, NY 11377; (718) 204-3300.**

NEW QUARTZ MOVEMENT CLEANING SYSTEM DEVELOPED

Louis A. Zanoni, President of Zantech, Inc., has announced a revolutionary new cleaning system for quartz watch movements. The six-second power spray drastically reduces cleaning time and improves movement performance. The new cleaning system uses a high-pressure solvent spray to dissolve contaminants and carry them away without disassembling the gear train. The pure cleaning solvent does not leave a residue. Tests have shown that the operating voltage of cleaned movements drops significantly after the six-second spray cleaning. No lubrication is necessary. It is only necessary to remove the circuit board, coil, date wheels, and any other plastic parts before spraying.

For further information, contact: **Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619; (800) 441-7569.**

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. August issue closed for copy on July 1st.)

HOROLOGICAL TIMES, P.O. Box 11011, Cincinnati, OH 45211
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Tradesman

CLOCKS: gearcutting, retoothing, repivoting, rebushing, jeweling. REPAIRING: timers, aircraft clocks, antique clocks, pocket watches. Send sample for estimate. NIEGELS HOROLOGY, Roy Niegel, CMC, CMW, 101 E. St. Joe Drive, Spirit Lake, ID 83869. SASE, or call (208) 623-4330.

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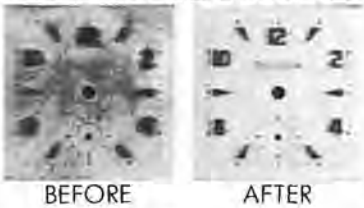

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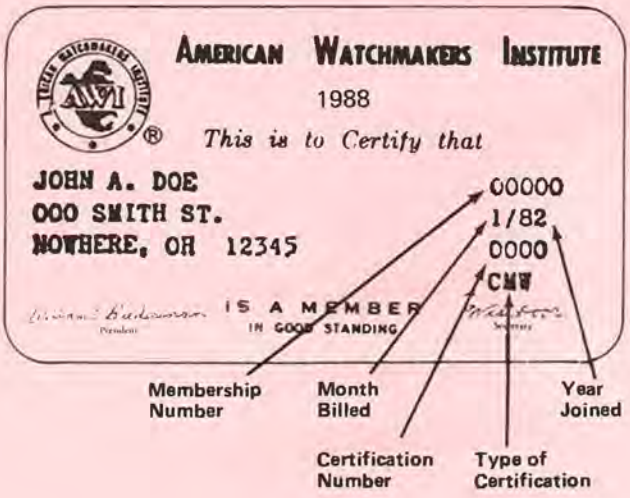

Dates to Remember

JULY 1988

8-9—Gesswein's Hands-on Casting Seminar, Gary Miller instructor; Bridgeport, CT; enrollment limited, cost: $250. Reservations/information: Gesswein, 255 Hancock Ave., Bridgeport, CT 06605; (203) 366-5400, ext. 265, Elaine Corwin, Technical Dept. Manager.

22-24—Watchmakers Association of Ohio Annual Convention; Parke University Motel; Olentangy River Road, Columbus, OH.

AUGUST 1988

6-8—1988 Heart of America MINK Jewelry Show; Doubletree Hotel; Overland Park, KS. Information: Sharon Blair (913) 381-2033.

7-8—Illinois Jewelers Association Chicago Show; Holiday Inn Mart Plaza/Expo Center; Chicago, IL. For more information: Jack Thompson, Convention Manager; 111 E. Wacker Dr., Suite 600; Chicago, IL 60601; (312) 644-6610.

26-28—Nebraska & South Dakota Jewelers Association 83rd Annual Convention; Midtown Holiday Inn; Grand Island.

SEPTEMBER 1988

8-11—Intermountain Jewelers Association's 27th Annual Convention; Jackson Hole Racket Club Resort; Jackson Hole, WY. For information: Ann Marie Molenaar-Schram, 1439 SW 4th Ave., Ontario, OR 97914. (503) 889-3213.

10-11—Iowa Jewelers & Watchmakers Association Convention and Trade Show; Airport Hilton Inn; Des Moines, IA.

30-Oct. 2—New York State Watchmakers' Association, Inc. 50th Annual Convention; The Hilton; Binghamton, NY.

OCTOBER 1988

8-9—Restoration of Fusee Watches Bench Seminar (AWI); Ralph Geiger, instructor; Seattle, WA.*

14-16—Antique Watch Restoration Bench Seminar (AWI); Archie B. Perkins, instructor; Boston, MA.*

14-16—Illinois Watchmakers Convention; Jumers Castle Lodge; Peoria, IL.

20-23—National Association of Watch and Clock Collectors (USA) 9th Annual Seminar "French Horology 1660-1820," Getty Museum; Malibu, CA. Information: Herbert Gold, 11995 Darlington Ave., Los Angeles, CA 90049; (213) 486-2136 (24 hrs.).

* Contact AWI Central for more information.

Ad Index

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