

DECEMBER 1985

HOROLOGICAL TIMES™

A winter scene featuring a snow-covered path leading through bare trees. A large, glowing lantern with a red top and orange light is prominent on the left. The sky is a clear, pale blue.

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HOROLOGICAL TIMES™

Official Publication of the American Watchmakers Institute



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P.O. Box 11011
3700 Harrison Avenue
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Telephone: (513) 661-3838

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To Our Members

Season's Greetings

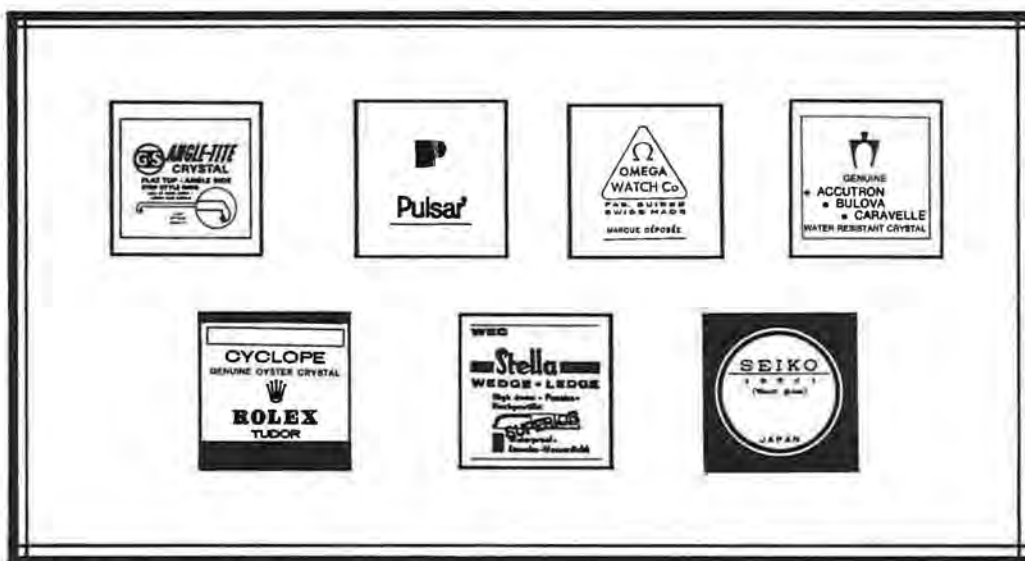
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PRESIDENT'S MESSAGE...



Fred S. Burckhardt

Don't Forget to Relax!

The worst phrase I hate to hear anyone utter is: "Someday I'm going to . . ." We all know people who use this phrase, yet they never get around to doing whatever it is they would really like to do.

One fellow I knew always talked about traveling, but he never wanted to take the time from business. I guess he was afraid that when he got back, the business would be gone. He died after a lengthy illness and never got to do those things he dreamed about.

The only reason I bring this subject up is because I feel it is apropos to this time of year—the holiday season. Many of us who work in stores and shops are spending more time at work than we normally do so that by the time the holidays arrive we are so worn out, both physically and

mentally, we don't get to enjoy them the way we should. A good friend in another state always talked about going away on a trip during the holidays but was afraid of the business he would lose. One year he decided to close the day before Christmas Eve and he and his wife went on a cruise, returning after New Year's day. He does this every year now. His customers know he'll be closed, so they shop before time. His business has grown every year!

I guess what I'm trying to say is, don't starve yourself. Take advantage of life's banquet. All the money in the world won't buy you what has already past. Do like the saying says: "TAKE TIME TO SMELL THE ROSES!"

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Bench Tips

Joe Crooks



PITHWOOD STILL ALIVE & GROWING

Hallelujah!! Do I have good news for us "old-timey" watchmakers who can't make ourselves put a screwdriver or tweezer on a watch we're assembling without first cleaning them in pithwood! This tip comes from Jay Hughes of Lakeland, Florida.

I just received the October, 1985 issue of *Horological Times* and read your article regarding pithwood.

The J & B Company recently purchased the pithwood business from George Walker, who had to give up the business because of major illness a few years ago. The J & B Company is presently producing and shipping the original Florida Pithwood—not "corn stalks." We are in the process of mailing letters to wholesalers with wholesale prices listed.

In doing a market survey prior to buying the assets of the company, we determined that there was a very substantial pent-up demand. We will be beginning production this fall. The same letters and a sample is being mailed to Henry Fried, and to Ted Jordan of Ted's Jewelers, Chester, South Carolina.

Thanks for the sample of Florida Pithwood and the good news it's now back in business and "growing" well. I haven't seen such nice pithwood in four years.

Okay, you watchmakers out there who can't do without your pithwood: Call your material house and tell them to order some from the J & B Florida Company.

Jay, you state that a sample was sent to Henry Fried. Now maybe he will clean those over-a-hundred-years-old sticks of pithwood (with the strange little crawling things in it) out of his bench!

Have a nice Christmas and a Happy New Year, and keep your pithwood dry!

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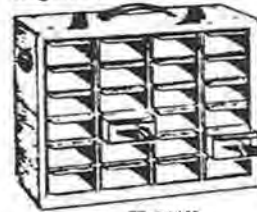


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303	11.56 x 5.59	354	11.56 x 4.14	381	11.56 x 2.06	395	9.50 x 2.67	E92	10.5 x 44.3
309	7.87 x 5.33	355	15.49 x 4.83	384	7.87 x 3.63	396	7.87 x 2.67	E93	26.2 x 50.0
311	9.50 x 1.05	357	11.56 x 5.36	386	11.56 x 4.19	397	7.87 x 2.67	1235	26.2 x 49.2
313	11.56 x 5.33	361	7.87 x 2.06	387	11.56 x 3.48	399	9.50 x 2.67	E95	34.1 x 61.1
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Chime and Strike

Steven G. Conover



Jacques Dual Chime* Grandfather Clock

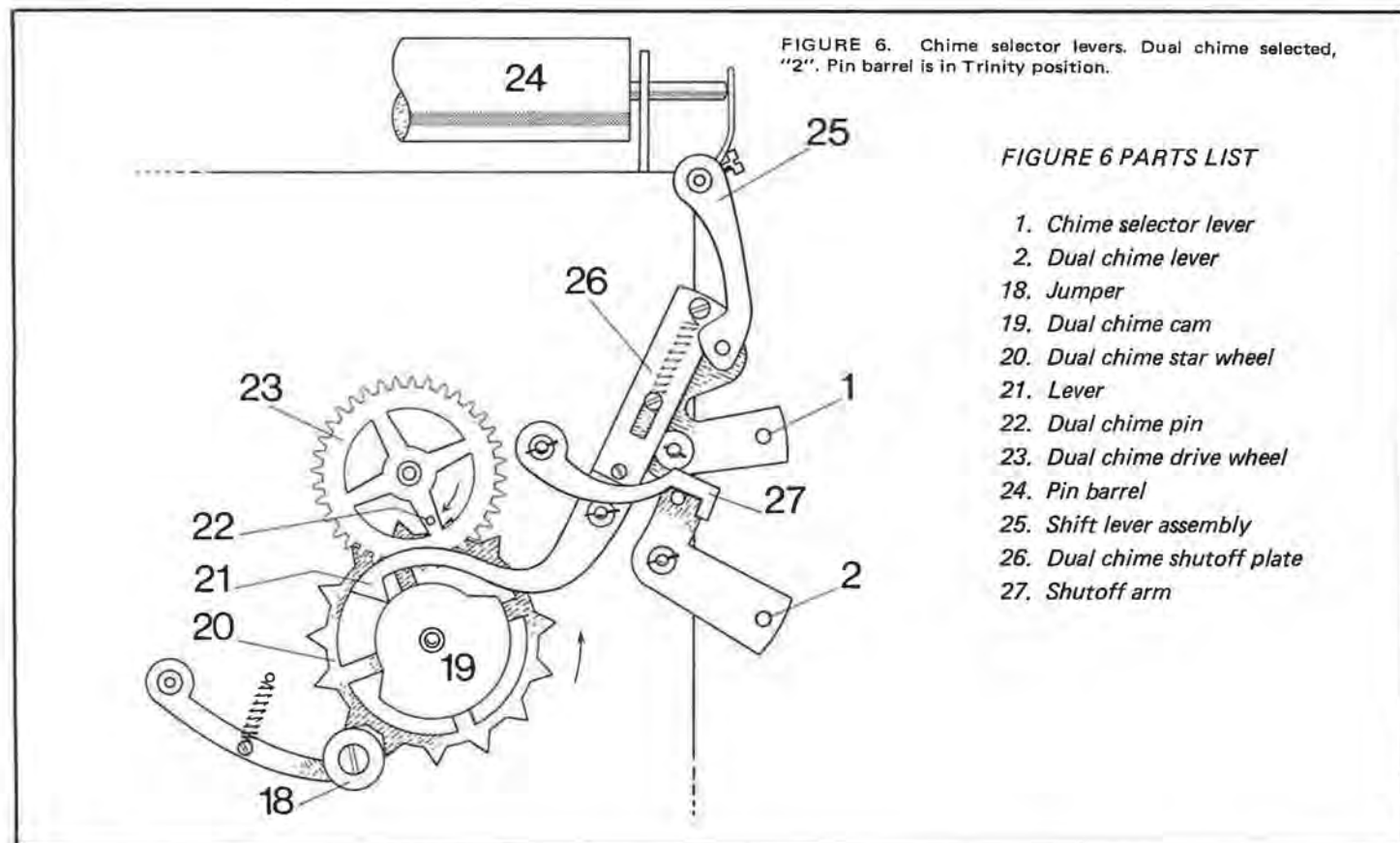
PART 2

In the October article we looked at the chime and strike mechanism of a Jacques grandfather clock. We continue this time, as promised, with a study of the dual chime selector in the same clock. Clocks with multiple chimes are common today, and each one has some kind of mechanism to permit selection of the chime melody. But the Jacques takes us a little "off the beaten path," offering us the option of having the chimes change automatically each 12 hours.

If you refer to the October article, you can see the chime selector area of the dial. The chime selector lever allows the choice of "W" or "T," Westminster or Trinity. However,

this selection can only be made when the dual chime lever is on "1," which stands for single chime. If the lever is on "2," the clock is set to automatically switch from one chime to the other twice per day. The owner cannot determine which chime is played at any particular time. To regain control, he moves the dual chime lever back to "1." Then he can select either Westminster or Trinity to be played until he wants to change it again.

Our purpose in this article is to get behind the dial to examine the workings of the chime selector mechanism. At first it appears rather involved, but perhaps this is because we don't see this kind of device every day. To maintain



continuity, I have numbered the illustrations and parts list from the point we left off in October. You can refer to Figure 6 for an overall view of the dual chime selector, located on the right front portion of the movement. Figures 7 and 8 show the same chime selector levers in different positions. In Figure 9, I show the mechanism on the back of the dial which prevents the user from selecting chimes when the clock is on "automatic" (2).

DUAL CHIME POSITION

When the dual chime selector is set on "2," the mechanism appears as in Figure 6. The dual chime drive wheel (23) is driven off the motion work. It has a pin (22) which contacts the dual chime star wheel (20), moving it one tooth space at a time. The jumper (18) holds the star wheel in each successive position. The purpose of all this is to move the dual chime cam (19). The cam has two surfaces, each covering half its circumference. The smaller diameter segment corresponds to Trinity; the other to Westminster. We'll see why in a moment.

The cam acts on the lever (21). In turn, the lever either pushes the pin barrel to the left, against spring pressure, for Westminster, or allows the pin barrel to return to the right, for Trinity. In the illustration, the lever is in the Trinity, or rest position. Remember that the cam turns gradually, step by step. The illustrations show the cam in the middle of each position, for clarity.

Figure 7 shows the lever in the middle of the Westminster phase. The entire lever has pivoted clockwise. As a result, the dual chime shutoff plate (26) applies pressure to the shift lever assembly (25). The pin barrel (24) is pushed to the left, bringing the Westminster pins to bear on the hammers.

As the cam turns around to the Trinity position, the lever goes back as shown in Figure 6, releasing the pressure on the shift lever assembly. The pin barrel moves back to the right, under spring pressure. Now the Trinity set of pins will lift the hammers.

SINGLE CHIME POSITION

When the owner moves the dual chime lever in the dial to the "1" position, he regains control of chime selection. He can change chimes whenever he wishes, but they no longer change automatically. Figure 8 shows the Trinity chime selected manually. What concerns us here is the means for cancelling out the automatic changing of chimes.

As the dual chime lever is moved up to "1," it pushes on the shutoff arm (27). The arrows in Figure 8 show what happens. The shutoff arm shifts the dual chime shutoff plate (26) upward, against spring pressure. The top end of the shutoff plate is now too high for it to touch the shift lever assembly (25). This means that although the dual chime cam keeps moving the lever back and forth each 12 hours, the lever cannot have any effect on the pin barrel. Instead, the chime selector lever determines which chime is played. It is directly connected to the shift lever assembly.

FIGURE 7. Clock still in dual chime "2" mode, with pin barrel switched automatically to the Westminster position.

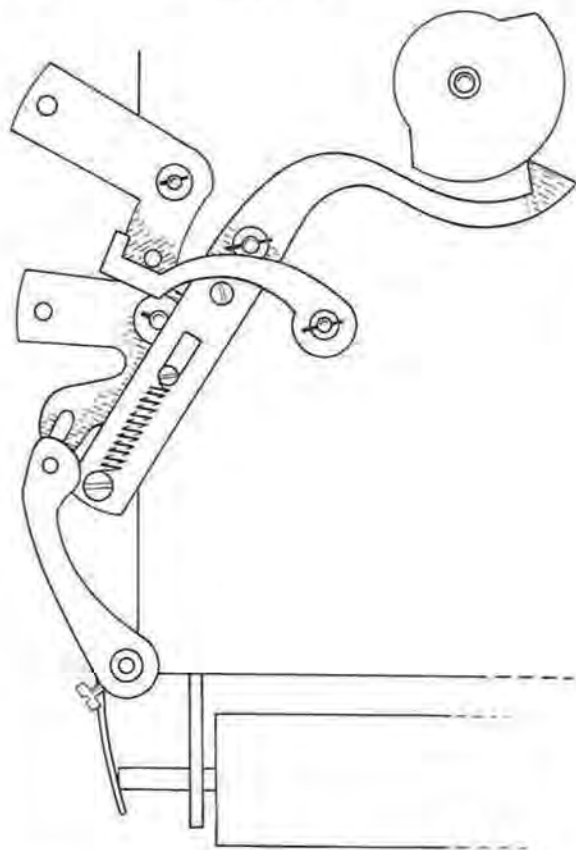
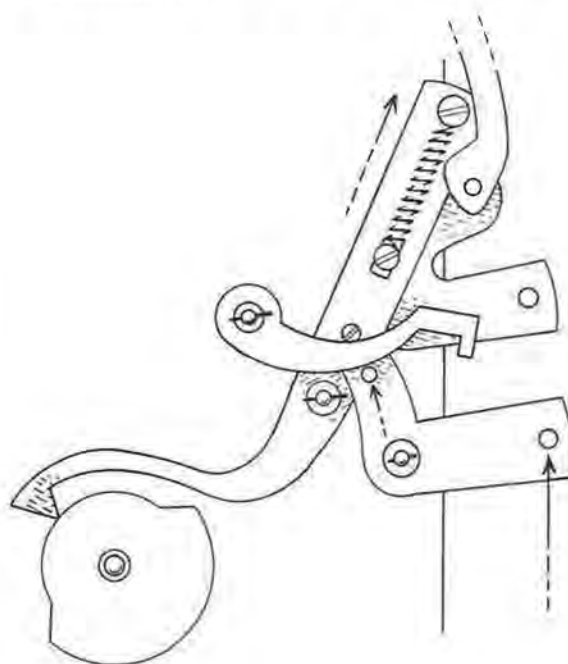


FIGURE 8. Single chime selected "1". Trinity chime has been selected manually.



DIAL PARTS (FIGURE 9)

Now it is time to explain how the chime selector lever is able to change chimes when single chimes "1" have been selected, yet unable to do so when dual chimes "2" are automatically changing chimes each 12 hours. The two views in Figure 9 give the answer.

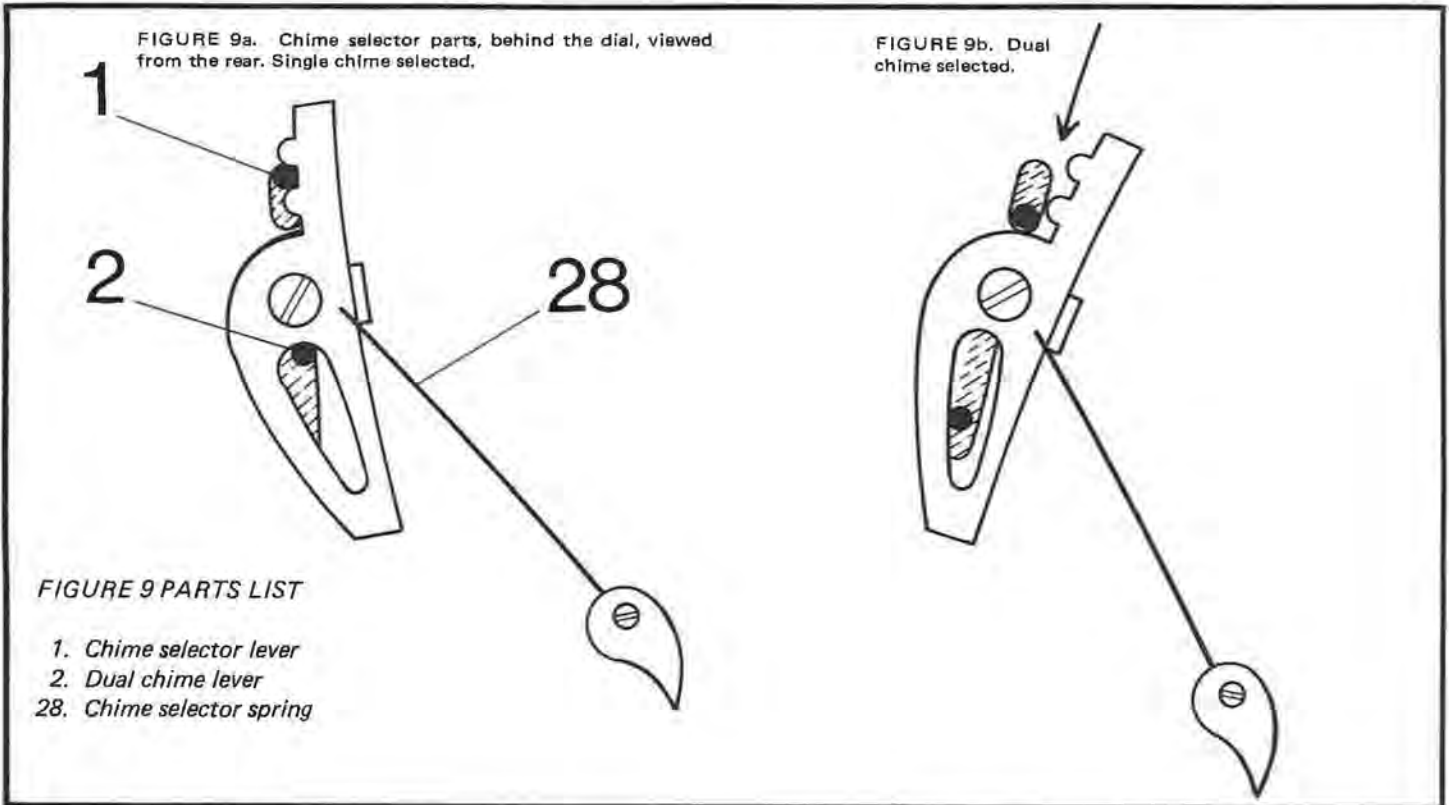
The parts shown in the figure are mounted to the back of the dial. The chime selector lever (1) and the dual chime lever (2). We view them from the back—from a "movement's eye view." The purpose of these chime selector parts behind the dial is to render the chime selector lever (1) inoperative when the clock is on dual chime. In other words, the clock does not permit manual selection when on "automatic" (dual).

Figure 9a shows the single chime position. The dual chime lever is "up," for single chime. A spring (28) pivots the

unit counterclockwise, keeping pressure against the chime selector lever (1). The owner can move the selector from Trinity to Westminster at will, with the spring assuring that the selection is maintained.

Moving to Figure 9b, the dual chime lever has been pushed to the "down" position. It is here that the mechanism must cancel out the effect of the chime selector lever (1). Remember, we don't want the lever to work; the clock is now on "automatic" and out of the owner's control. When the dual chime lever is pushed down, it moves in a slot to pivot the unit clockwise, against spring pressure. The arrow in the figure shows that the chime selector lever is no longer held in either position. If the automatic selection is Trinity, the lever will not stay down if it is pushed. If the selection is Westminster, you cannot push the lever up to stay.

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Questions & Answers

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A Pin-Set Watch

Q I am sending you two photos of a pocket watch, its make unknown. Could you give me any information on its identity? The only markings on the watch are the numbers 30993 stamped inside the cover. Thank you!

Tony's Master Jewelers
Lacey, WA



A Your watch is Swiss of the 1870 period and is called a pin-set watch. It is of medium to good grade, except for the use of the cylinder escapement, considered as a more modest-priced item in that range. The use of the cylinder eliminated the need for the more expensive, precise pallet and jewels.

I cannot identify the etch mark on the barrel bridge near the pendant. I have tried to compare it to many other markings without success. The markings on the case do not help much since they were two unrelated manufacturers. The watch probably has but six jewels, that is, if the escape wheel bridge is jewels; otherwise, four or less. The maker is thus unknown and most likely the movement was made in the Neuchatel-leLocle area, then the most active producer of ebauche movements.

Q I have a Universal 281 Chronograph watch in for repair. Someone glued the 12 hour register crown to the case. The crown, stem, and sleeve are missing. I have tried a few jobbers locally; one of these tried to order it from Switzerland, but with no success.

Can you come up with someone or some place that may have what I need for this watch? There are two stems in this watch, one for normal use, winding and setting the hands, and the other for the 12 hour register at the 12 o'clock position.

Ralph Sendbeck
Kenmore, NY

A Yours is about the fourth request for this calibre information received in the past six

weeks. The Universal 281 can be a troublesome movement to those unfamiliar with it. Otherwise it can give long service if handled properly.

To obtain parts for these, write to: Universal S.A., 501 Madison Ave., New York, NY 10022.

Q I need your help with a fine Swiss chronometer. I cannot disassemble the mainspring barrel from the barrel bridge without using any excessive force.

Information: 17 ligne Vacheron & Constantin, 27 jewels, serial #387,431, pocket watch movement, wolf teeth crown and ratchet wheels, mainspring barrel suspended from the barrel bridge.

The mainspring barrel arbor is squared on both ends, the arbor hub has two offset holes in it.



Can you tell me how to disassemble the mainspring assembly and the size of mainspring one should install?

Oscar Cox
Great Falls, MT

(Please turn to page 31)

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PART VI

SPECIAL FILES

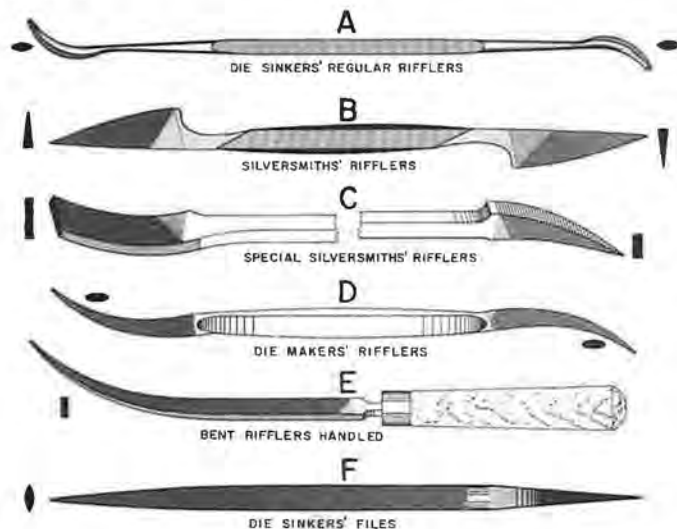
There are some special filing jobs that require the use of special files. Regular hand type files are not suitable because of their size and shape. The size and shape of the surface needing filing limit the size and shape of the file used.

Some of these special filing jobs are encountered by the tool and die makers as well as watchmakers, clockmakers, jewelers, and silversmiths.

RIFFLER FILES

Figure 1 shows some of these special files. View A shows a special die sinker's regular riffler file. This is a double-ended file which is shaped approximately the same at each end although some of these files are shaped differently at each end. This particular file has an oval shape for filing concaved surfaces. This file is one of the more than 60 different styles and sizes that are available. In fact, the Grobet File Catalog shows 67 different die sinkers regular riffler files. These files come in 6 and 7 inch lengths in cuts of #0, #2, #4, and #6. There is a wide selection of styles and shapes made in these files. The files are numbered to identify them as to their style and shape. One set of these files is numbered from 1 to 18.

Figure 1



Other styles are numbered from 101 to 209 with some numbers absent. Each style is for a specific filing operation.

Figure 2 shows a riffler file being used to file a concaved surface. It would be difficult to reach this particular surface with a hand type file due to the fact that there is a shoulder at the end of the concaved surface which limits the length of stroke of the file. Note the way the riffler file is held in the hand.

Figure 1, View B shows a silversmith's riffler file. This file is also double ended. Both ends of this file are knife shaped. Other shapes supplied in silversmith's riffler files are: curved pointed half-round, curved sharp pointed triangular, curved sharp pointed crossing, curved sharp pointed round, curved sharp pointed flat, curved blunt ended flat, curved sharp pointed square, and curved blunt ended square. These files are made in 7 and 8 inch lengths. The cuts are #0, #2, and #3.

View C, Figure 1 shows a special silversmith's riffler file. These files are larger than the riffler files shown previously. They are made in 8-inch lengths and #1 cut. One end of the file shown in View C has a curved blunt flat shape and the other end has a sharp pointed flat shape. Other shapes

Figure 2



supplied are: one end curved pointed half-round and the other end curved pointed triangular; one end curved pointed oval and the other end curved half-round; one end curved blunt oval and the other end sharp pointed oval; one end flat curved blunt and the other end curved pointed knife; one end curved pointed square and the other end curved pointed flat; both ends curved sharp pointed oval; both ends curved sharp pointed triangular; one end curved sharp pointed half-round and the other end curved pointed oval; both ends with pippin shape; both ends curved flat with blunt ends; one end flat with one edge beveled and the other end flat with both edges beveled.

Figure 1, View D shows a die maker's riffler file. This file has sharp pointed ends that have an oval shape. There are 30 different files in this series. The shapes are: oval, half-round, triangular, flat, round, barrette, pippin, slitting, square, crossing, knife, etc. In most cases, the ends of each file have different shapes. These files are supplied in a 7 inch length and cuts #0, #2, and #3.

View E, Figure 1 shows a bent riffler file with handle. This one has a flat shape with sharp point. Other shapes supplied in this file are: three square rasp, half-round bastard, joint bastard, three square bastard, round rasp, and hand bastard. The length of the cutting part of these files is 3½ inches.

View F, Figure 1 shows a die sinkers file. These files are specially made for die work. The length of the cut is 3-1/2 inches and they are supplied in #0 and #2 cut. The shapes are: lozenge, oval, square, round, three square, crochet, flat, auriform, half-round, pippin, knife, and warding.

FILES FOR FILING MACHINES

Figure 3 shows some other special files. These files are used in different makes of filing machines. View A shows a filing machine file which is a Type A file and is used in bench filing machines. This file has a round shank that is 1/4 inch in diameter. The length overall is 3-1/4 inches, and the length of cut is 2-1/4 inches. This file is made in two cuts, #00 and #2. This file cuts on the downward stroke. The shapes supplied in this file are: square, crochet, pippin, oval, half-round, knife, lozenge, cant, three-square, equalling, and pillar.

Another bench filing machine file is shown in View B, Figure 3. This file is a Type B machine file which cuts on the downward stroke. It will be noted that this machine file is more slender than the Type A file. The shank is round and measures 1/8 inch diameter. This file is supplied in the same shapes as the Type A file.

View C, Figure 3 shows a Type C machine file. This file has a tang similar to the tang of a hand file. In fact, this file can also be used by hand. The length of this file is 7 inches overall and the length of cut is 5 inches. This file cuts on the upward stroke. The shapes that this file is supplied in are as follows: round, square, pillar, crochet, three square, crossing, half-round, knife, pippin, lozenge, and cant. The cuts are #00 and #2.

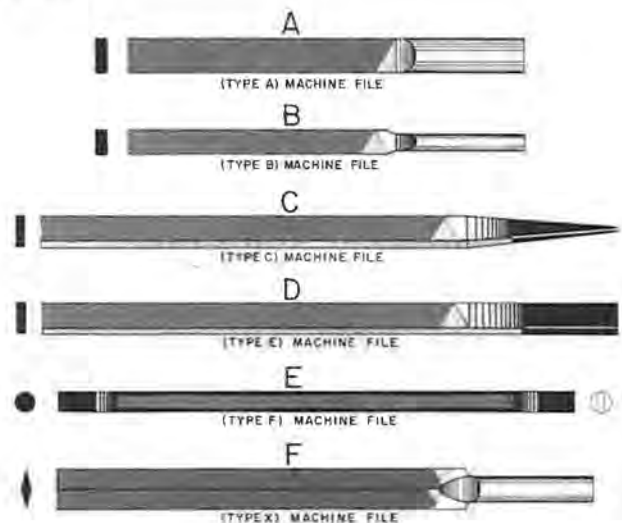
View D, Figure 3 shows a Type E machine file. This is a straight (parallel) file that is used in Oliver, Harvey,

Cochran-Bly, and Milwaukee filing machines. It cuts on the downward stroke. The overall length is 8 inches. The length of the cut part is 6 inches. The cuts are #000, #00, and #2. This file is supplied in the following shapes: round, square, pillar, crochet, three-square, half-round, crossing, oval, knife, pippin, equalling, lozenge, and cant.

View E, Figure 3 shows a Type F machine file. This is a parallel shaped file which has its ends formed into a flat shape for attaching to the file holders of the filing machine. This style of machine file is used for Thiel, Excel, Index, and Simplex filing machines. This is a tension type machine file which is supplied in the following cross section shapes: flat, square, three-square, cant, round, half-round, crossing, knife, crochet, pippin, oval, and ratchet. The cuts are #00 (bastard) and #2 (smooth). These files are made in 4 inch, 5 inch, 6 inch, and 8 inch lengths.

View F, Figure 3 shows a Type X machine file. This is a parallel file which has a round shank and cuts on the downward stroke. The round shank is 5/16 inch diameter. The overall length of the file is 4-3/4 inches and the length of the cut is 3-1/2 inches. This file comes in cuts of #00 and #2. The cross section shapes are: square, crochet, pippin, oval, half-round, round, knife, lozenge, cant, three-square, equalling, and pillar.

Figure 3



FILING MACHINES

For doing precision filing, the filing machine is indispensable. The filing machine is used by the tool and die maker, but it is also useful for the watch and clockmaker. Some examples of how the watch and clockmaker can use the filing machine are: To file the crossings in a wheel blank; for filing levers and springs being made for antique clocks and watches; for filing the space and plug when replacing wheel teeth; for making regulators, clicks, racks, snails, pallet forks, clock pallets,

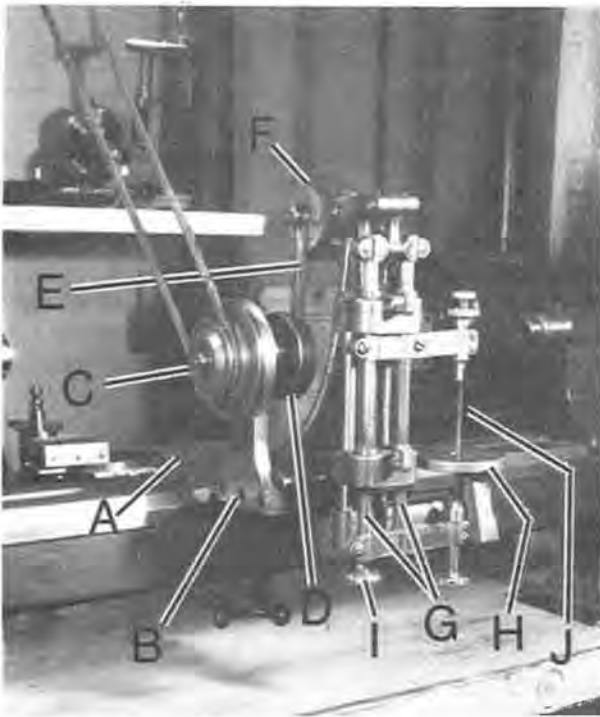


Figure 4

balance wheels, detents, bridges, and making hands, as well as for making tools needed by the watch and clockmaker.

Figure 4 shows a filing machine fitted to the bed of a toolmaker's lathe. This filing machine was used in the Elgin Watch Factory. There is no name on the machine; therefore, it was probably made in Elgin's machine shop for their own use. A description of this filing machine is as follows. The filing machine is mounted onto a special plate that fits on the bed of a large lathe. This place can be seen at View A, Figure

Figure 5

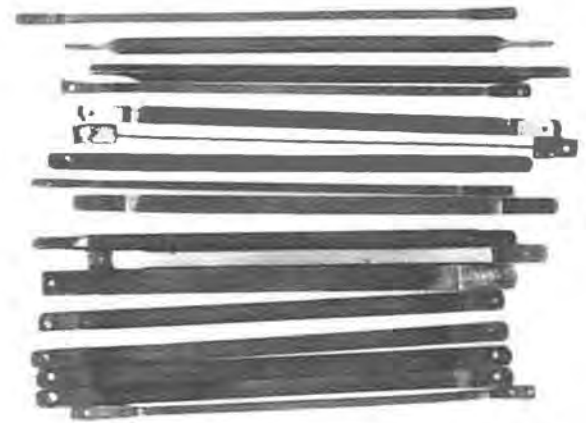
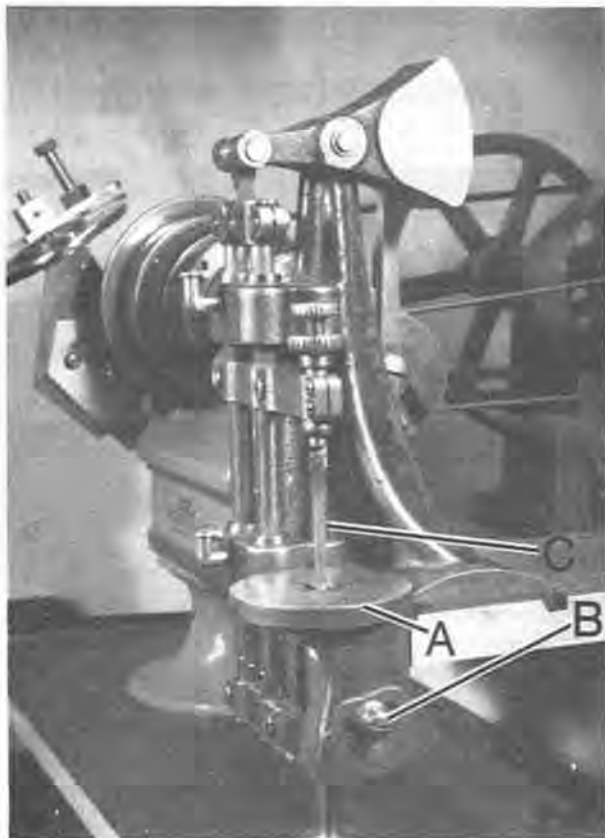


Figure 6



Figure 7

4. Mounted on the end of this plate is the pulley mount shown at View B. The pulley mount has a large brass bearing which is used to support the pulley shaft. The pulley shown in View C is mounted on one end of the shaft. On the other end of the shaft, a drive plate is mounted. This plate is shown in View D of Figure 4. The drive plate has a dovetail slot across the center of its face. An adjustable drive block is fitted to the dovetail slot. This block can be set off center to allow for different lengths of strokes of the filing machine. Fastened to this adjustable block is connecting arm E. The other end of this connecting arm is connected to the side of a counterbalanced arm shown at F. The counterbalanced arm is pivoted near its center on the end of the filing machine frame. The end of the counterbalanced arm is fastened to the slide carrying the file. As the pulley of the filing machine is turned, the slide carrying the file is caused to move up and down. The two steel rods "G" that the file holder is mounted onto move up and down in the bearings of the filing machine frame. The table of the machine is shown in View H. This table is adjustable up and down by turning adjusting screw I. The table will also tilt and can be set to any angle up to 10 degrees. The tilting of the table is used mostly in die making work. The file goes through the hole in the center of the table. The file is shown in View J.

Figure 5 shows a close-up view of the opposite side of the Elgin filing machine. View A shows the table, View B shows the binding screw which binds the table in the desired (Please turn to page 18)

#1

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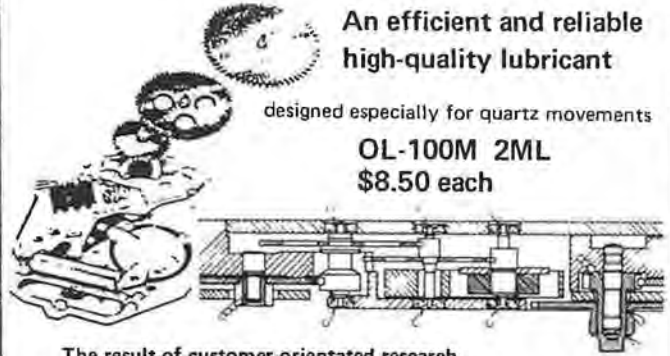
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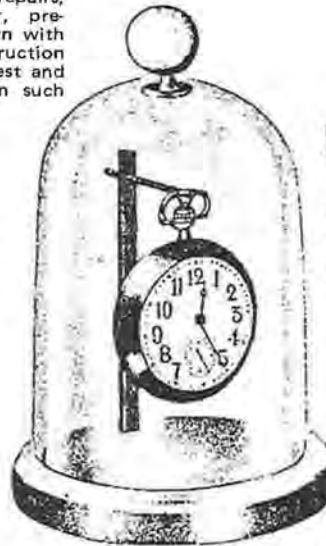
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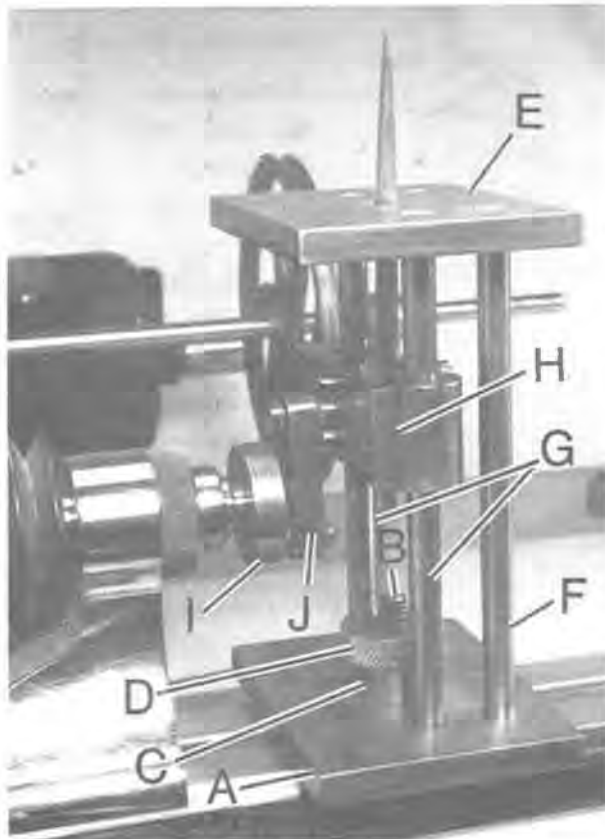


Figure 8

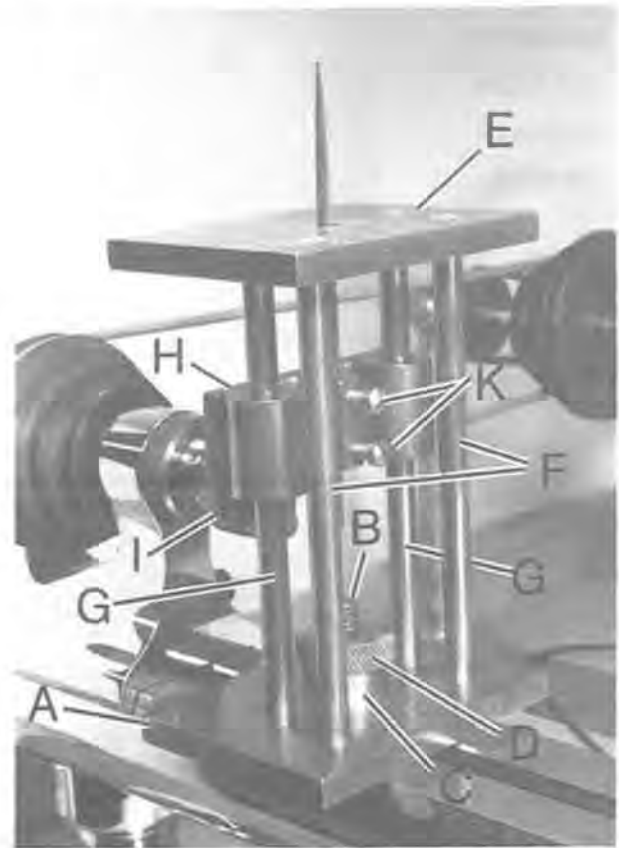


Figure 9

position, and View C shows the file.

Figure 6 shows the assortment of files used with the machine. This is a Type F file. They are held in the file holder of the filing machine by both ends and are tensioned between the two holders to give them rigidity to help prevent them from breaking when they are used. Each end of the file is held in a special chuck that fits into the file holder frame. A set of these special chucks is shown in Figure 7.

Another style of filing machine is shown in Figures 8 and 9 (two different views of the same machine). This filing machine fits on the bed of a watchmakers lathe and is motivated by the lathe headstock. This filing machine can be made by the watch and clockmaker. The plans for this filing machine can be found in "Practical Benchwork for Horologists" by Louis and Samuel Levin. A description of the machine follows. Please refer to both Figures 8 and 9. The base "A" of the machine is kept aligned on the bed by two pins (not shown) screwed into the bottom of the base. The base is held to the bed of the lathe by the use of bolt "B", washer "C", and nut "D". The head of the bolt fits into the "T" slot of the lathe bed. The table "E" of the machine is separated from the base by two 1/4 inch brass rods "F" and two steel rods "G". The brass rods are used as spacers between the base and the table. The two steel rods are used as bearing rods for the bearings on the slide assembly "H" to slide on as it is moved up and down. The slide assembly is caused to move up and down by an offset screw on the drive plate "I" and the connecting lever "J" which connects to the

file slide assembly. The drive plate has a shaft extending from its back side that fits a #50 wire chuck. When the lathe is turned, the offset screw on the drive plate holding one end of the connecting lever serves as a cam to motivate the slide assembly, moving the file up and down through a hole in the file table. The file is held in a block that is fastened to the cross bar of the slide assembly. The file is held in the block by two screws "K".

Figure 10 shows this filing machine being used to file the crossings of a clock wheel blank.

Figure 10



Figure 11 shows a simple filing machine that can be made by the watch and clockmaker. The base of this machine has a post that fits into the hole in a solid hand rest. The slide of this machine is motivated by a special chuck which fits the lathe headstock. The chuck has riveted to its end an off-center drive plate that works in a wide slot in the back of the slide of the filing machine. The file is held in the slide by two screws. The file goes through a hole in the table. As the lathe is turned, the cam action of the drive plate moves the slide holding the file up and down. Articles being filed are held on top of the table.

Figure 11



*This concludes the articles on
"FILES AND FILING".*

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Update Your Bench



Before we know it, a new year will be upon us but our old bench will look just the same unless we see the need to make changes. This is probably a good time to make our new year's resolutions to include those things necessary to update our working conditions.

December, being the busiest month in the year for our trade, may be a difficult time to accomplish this task. Maybe we can work on this on New Year's Day. On second thought, perhaps a better time would be some evenings between Christmas and New Years.

It seems so hard to find that extra time. At this point we are tempted to just put it off for a while. "A while" means next month, next year, or even later! Personally, I never have the time, so I catch myself taking the time (or should I say "making the time") after business hours and generally at the busiest time of the year.

This extra busy time is when we realize the importance and real necessity to improve our working conditions. The real need shows up when we cannot find that part we know we have in stock. So let's take a good look at our benches and working areas and see what we might want to change. These changes are not necessary because we are not organized now, but because the advent of quartz has changed our needs.

We can remember the time when our material cabinets were all stacked within a close reach to our right or left, and this even included our crystal cabinets. We were using our American staffs, jewels, mainsprings and Swiss material cabinets enough to warrant them being placed in an easily accessible position.

Since we reach for our AWI Battery Number System (BNS) chart and fit many batteries each day, it becomes important to have these power cells within "sitting" reach. I have two 40-drawer plastic storage cabinets, one stacked on the other which gives me 80 drawers, placed to the right of my bench. (See Figure 1.) Each drawer is numbered with the AWI numbers. We have numbered our drawers as shown. The checks (✓) show the ones we have not stocked yet. Of course, we need our quartz testing equipment, which includes our battery tester (with LOAD testing feature), very close for easy use.

BATTERY DRAWER CABINET

S-01	S-21	S-54	L-11
S-02 ✓	S-22	S-56	L-12
S-03 ✓	S-23	M-01 ✓	L-14
S-04	S-24	M-02	L-16 ✓
S-05	S-25 ✓	M-04	L-18
S-06	S-26	M-06	L-20 ✓
S-07	S-27	M-08	R-01 ✓
S-08	S-28	M-10	R-03 ✓
S-09	S-30	M-12	R-05 ✓
S-10	S-32	M-14	R-07 ✓
S-11	S-34 ✓	L-01	R-09 ✓
S-12	S-36 ✓	L-02 ✓	R-11 ✓
S-13	S-38	L-03	A-01 ✓
S-14	S-40 ✓	L-04 ✓	A-03 ✓
S-15	S-42 ✓	L-05	A-05 ✓
S-16	S-44 ✓	L-06 ✓	A-07 ✓
S-17	S-46 ✓	L-07	
S-18	S-48 ✓	L-08	
S-19	S-50 ✓	L-09	
S-20	S-52	L-10	

Figure 1



Until recently, some of this equipment was sitting on the back of my bench and the probes could dangle across part of my bench and sometimes rake off some small watch parts. So I made an extension section and added it to the left side of my bench—a few inches lower than the regular bench top height. Now I can easily see my testing dials, digits, meters, etc. The most important advantage is the fact that the probes can be plugged in permanently and moved to the center area of my bench when in use. They can be easily stored to the left side and without interfering with any other repair setup.

This did necessitate moving my lathe to a new location a few more inches to the left and at a right angle to my bench. The new lower bench height for the lathe proved a real advantage.

I forgot to mention that I also placed my Accutron equipment to the left of this right angle extension at the proper height for easy use. I realize that many choose to use a separate bench just for electronics. I am sure that there must be some real justifications for doing this. If one was building a bench just for this purpose, the bench top height could be suitable for quartz repairs. Maybe I'll build one just for this purpose someday, maybe next year or the year after . . .

In the meantime I feel more comfortable sitting at one bench (i.e. - with the extensions) and using many of the same tools for everything. Of course we must use non-magnetic screwdrivers and tweezers and a few other special tools made just for electronics.

This article is not to suggest that anyone would want a bench exactly like mine, but it is written to stimulate one to give a "look see" and then decide. After all it's just about time for those new year's resolutions, so how about one for the good of your shop!

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THE PICKLE BARREL



Marshall F. Richmond, CMW

Boric Acid and Alcohol

One subject that has generated more inquiries than any other topic is the use of boric acid and alcohol in the repair of jewelry. One of the most frequently asked questions is: Do you use borax and alcohol or boric acid and alcohol? My answer is that I have used both. To clarify this I will try and give an explanation about borax and boric acid. In all of the articles I have written previously I have drawn on my own experience. In order to properly explain this I used an encyclopedia to obtain the chemical formulas and descriptions of each substance.

The formula for borax is $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10 \text{H}_2\text{O}$. The boric acid formula is H_3BO_3 . These formulas to me only mean that they are not the same total chemical but they both do contain boron. Each is a white crystalline substance with the boric acid appearing in smaller crystals. Both have fluxing properties and when applied to metal with heat they form a coating of hard glaze. When heated to the point of solder flow the coating remains intact and acts as a flux where the solder flows and as a shield against oxidation in the surrounding area. When first starting to do jewelry repair I purchased washing borax at the grocery store and used a borax slate as my flux for gold and silver soldering. Later I found that manufactured fluxes are far superior; this is what I now use entirely. Boric acid can be purchased at any drug store in small packages. It is commonly used as an antiseptic, and in a weak solution as an eye wash. In doing jewelry crafting and repair however, we have another use for it.

Now we will dispense with technicalities and get down to common sense and logic. I have found by experimentation that boric acid will actually dissolve in alcohol, while borax will settle to the bottom of the container and has to be stirred or agitated before using. Both can be removed by boiling them in water or by dipping them in hot pickling solution. Either will perform the same function which is to protect the piece of jewelry from oxidizing.

Judging from some of the questions that have been

asked it appears that there are some misconceptions as to what the borax or boric acid and alcohol will or will not do. What it will do is to cover the article of jewelry with a coating that shields it from the oxygen in the air or from the torch and keeps the surfaces surrounding the solder joint from oxidizing. This is simply all it does. Some craftsmen have been led to believe (probably through a misunderstanding) that these compounds will protect stones from heat. **THEY WILL NOT.**

Several years ago a jeweler from a nearby community called me and asked if he could come to my shop to experiment on a silver ring which contained a black onyx stone; he wanted my assistance. Heat needed to be applied on the shank near the stone and he thought by using boric acid and alcohol he could make the solder joint without removing the stone. He had been told that the onyx would be damaged beyond repair if heat was applied. The jeweler said that the ring was of no value to him and he wanted to experiment with it. Heat was applied and the stone shattered. This proved to him that these compounds would only protect the finish from oxidizing. Although I knew that the stone would shatter upon application of heat, this incident gave me the actual experience to back up this knowledge.

Using boric acid and alcohol is simple and takes very little time. Simply put the boric acid in a glass jar and cover with alcohol. Put the lid on and shake it or just stir it. If it does not all dissolve add a little more alcohol and it will make a clear solution. If the alcohol evaporates and some of the boric acid settles to the bottom later, just add more alcohol and stir or shake it. Then it is ready to use again. If borax and alcohol is used, the borax will settle to the bottom of the jar in a short time and must be agitated by stirring or shaking before using.

Applying the solution to the jewelry is done by simply dipping the article of jewelry in the solution and igniting it by passing it over the flame of the torch or using a match or lighter. Lay it on the soldering pad to burn out. This

will leave a dull white coating all over the piece of jewelry. Do not rely on the coating to be the flux; make the solder joint in the usual way.

Articles to be soldered should be pre-cleaned. Dirt under the protective coating is probably flammable and will burn which can make it more difficult to clean than it is to remove and oxidize. The protective coating left by this process can be an important tool in saving the time required to remove oxides left by heat. It also eliminates having to remove the plating to get the oxide removed from items that are gold plated, silver plated, or rhodium plated. Many silver and gold plated articles have a very thin electroplate and if oxides form on them they have to be removed by polishing or by using chemicals. Either process will remove some metal, and if the plating is thin possibly all of it, leaving only the base metal. In the case of rhodium plated articles, they will turn a blue color when heated to make a solder joint. The rhodium plating must then be polished off to get a good finish. If the rhodium is on solid gold, a proper finish can be accomplished by polishing but rhodium is so hard it is difficult to polish. I have asked several craftsmen who rhodium plate if the rhodium can be removed by electrolysis (stripping). I have always received a negative answer. Thus, if using boric acid and alcohol to protect the finish can save much time and a nicer finished repair can be obtained, it is well worth the extra effort.

Since most, if not all, manufactured fluxes contain borax, another problem may be encountered. The areas surrounding the solder joint may have a glaze from the flux after the article cools. This may even occur from the borax or borax and alcohol coating. Sometimes this glaze shows up in small domes or beads, and if the article is polished without removing them, the abrasives in the polish will not remove them since the borax glaze is harder than the abrasive. Thus, all surrounding surfaces will polish and after cleaning small spots may show. These spots are due to metal surrounding them being removed during polishing. To eliminate this situation before it becomes a problem, remove the glaze before polishing by simply boiling in water or pickling solution. I always keep a small copper ladle by my jar of pickling solution which is used for boiling very small amounts of pickling solution over the flame of the torch. By using pickling solution most foreign substances are removed, including any oxides that may have developed in places not reached by the protective coating. I usually follow this procedure by placing a bronze wire bristle brush on the polishing motor and burnish the piece while it is still wet. This procedure has prepared the piece to be polished with abrasives.

In applying heat for hard soldering, many problems can be eliminated by applying enough heat fast enough to bring the metal to the flow temperature before the flux can burn off. Prolonged heat on fluxed metal without bringing the metal to the flow temperature of the solder can actually burn off the flux and the solder will not flow unless more flux is added. There are so many factors involved in making repairs that there is no given rule on what size torch or what size tip to use for any given job. This can only be learned by practice and experience. The size of the metal to be soldered is one factor. The larger the metal the more heat that is required to bring the metal temperature to the flow point of the solder. The metal used is another big factor because some metals are better conductors of heat than others. Silver is such a good conductor of heat that it takes possibly twice as much heat to make a ring size joint as it does in other rings of the same size. On some heavy silver rings with stones, I usually size them without removing the stones by shielding the stones with

wet tissue paper.

On some jobs enough heat can't be produced with a standard jewelers torch with its largest tip. I then use a regular welder's oxygen and acetylene torch with the smallest tip. This usually gets the job done but care must be used not to melt the metal. If the flow temperature of the solder can be reached without the heat reaching the stone, the solder joint can be made without stone removal. By using wet tissue it is easy to tell if the heat is reaching the stone area because the tissue will dry on the edges and start to scorch. This is the danger sign that tells us to remove the heat, remove the stone, and then make the solder joint. The direction from which the flame is applied can be a factor also. If it is applied from the bottom of the shank it will put a lot of heat on the stone area where it is covered by the wet tissue, but if it is applied at a right angle the bulk of the heat is directed away from the stone area. When attempting to make a repair that you are not familiar with, it is a good idea to experiment first on some kind of practice material such as copper, brass, or old jewelry that is considered scrap. If successful, then make the repair on the customer's jewelry.

One point that has not yet been made clear is the kind or type of alcohol to use in making up the solution of boric acid or borax and alcohol. My experience tells me that any alcohol which will burn freely is alright to use for this purpose. It can be wood alcohol or denatured grain alcohol. Rubbing alcohol seems to be diluted with water to some extent and does not burn as well as 190 proof alcohol. Alcohol can be purchased at any drug, paint, or hardware store. Many paints use alcohol as a solvent, even spirit duplicator solution is alcohol and will burn well.

A student in a jewelry class listened to the instructor explaining the use of boric acid and alcohol. The student heard his instructor say pure alcohol, so when he tried to buy pure grain alcohol he found it unavailable. He then went to another state and found 190 proof grain alcohol in a liquor store. (Of course, it was sold for the purpose of mixing drinks.) He paid at least five times as much for it as the cost of commercial denatured alcohol since much of the cost was tax. The burning ability of the pure grain alcohol was excellent but no better than the commercial. Earlier I referred to a misconception regarding the shielding qualities of boric acid and alcohol. This is an example of how these misconceptions can take place, so never be afraid to ask questions. Questioning is just another way to learn.

In the next article the topic will be solders, soldering, brazing, and welding.

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DECEMBER

ZIRCON

The two most important ores of zirconium are the minerals zircon (zirconium silicate) and baddeleyite (zirconium oxide). Zircon contains a small quantity of iron, and at times small quantities of hafnium, thorium, and uranium. Metamict is a type of zircon with low properties because the gemstone has undergone a breakdown of the crystal structure as the result of radioactivity.

Zircon is found in Thailand, Vietnam, Laos, Cambodia, Burma, Sri Lanka, South America, Africa, and Canada. In the United States small crystals of a variety of colors are found in Colorado.

Zircon is sometimes confused with diamond, corundum, synthetic corundum, spinel, synthetic spinel, chrysoberyl, beryl, topaz, tourmaline, peridot, quartz, garnet, synthetic rutile, doublets and glass. Zircon is a commonly used substitute for diamond, because it has high dispersion which produces a respectable amount of fire.

Considering the high quality, the great dispersion and the beauty of zircon, it is surprising that they are not more popular. Zircon approaches diamond in the degree of brilliance and fire, because of its high index of refraction and high dispersion. However, upon examination, you will see doubling of the back facets, which you will never see in diamonds. On the Mohs scale of hardness, zircon is 6 to $7\frac{1}{2}$, far below that of a diamond. Many zircons, after having been worn for a period of time, will show abrasions on the facet edges. The chemical composition is $Zr Si O_4$. Zircon is uniaxial positive.

Zircon crystallizes in the tetragonal system. There are three varieties: high, medium, and low property. High property zircon includes the colorless, blue, and brownish-orange. The refractive indices are $\omega = 1.920 - 1.931$ and $\epsilon = 1.967 - 1.993$. The birefringence is so strong that it can be seen with the naked eye. The specific gravity is $4.70 (\pm .03)$. The fracture is conchoidal. The dispersion is high .038. The birefringence is up to .059. It is $7\frac{1}{2}$ on the Mohs scale of hardness. Blue zircon displays strong dichroism, while others display weak dichroism. Medium property zircon includes dark red and brownish-green. The refractive indices are $\omega = 1.875 (\pm .045)$ and $\epsilon = 1.915 (\pm .030)$. The specific gravity is 4.32 ($\pm .25$). The effect of heating will convert it to the high property. Stones belonging to this type usually display a marked zonal or banded structure. This type is composed partly of the crystallized zirconium silicate (high type) and partly of the separate oxides (low type). The properties of the medium zircon depend on the ratio of the high type to

the low type. The low property zircon (metamict) is primarily found in Sri Lanka. It shows no trace of crystal form. The specific gravity is $4.00 (\pm .07)$. The refractive indices are $\omega = 1.810 (\pm .030)$ and $\epsilon = 1.815 (\pm .030)$. The birefringence is .005. It is softer than other zircons registering only 6 on the Mohs' scale of hardness. The low type of zircon is always green.

TREATED

Many of the zircons have been colored by irradiation over geological periods of time. This irradiation in the earth's crust was produced at the time of the creation of the planet and still remains because of the long decay periods. Zircon, which at times can contain more than ten percent thorium and two percent uranium, is affected by this irradiation. Zircons are found in brownish-orange, yellow, yellowish-green, brownish-green, dark red, light red-violet, golden brown, blue, and colorless. Blue, red, and colorless are extremely rare, and it is assumed that all these colors, used in the jewelry trade today, have been treated. Just as natural zircons may change color when exposed to bright light for an extended period of time, and revert to their original color when confined to total darkness, unstable treated stones have been found to react the same way.

In an experiment several years ago, heat-treated Indo-Chinese zircons were exposed to beta-ray radiation. All the blue and white stones turned reddish-brown, which could have been their original color. A brown zircon from Thailand was heavily irradiated with radium and turned deep violet, but later faded when exposed to daylight. Brown zircon, when exposed to 1000° centigrade for several hours can turn blue, colorless, or some off color. The off color, when exposed to 900° centigrade with an extra amount of air, will convert to colorless, yellow, orange, or red. In some cases, this process may have to be repeated several times.

SYNTHETICS

Several years ago synthetic zircons were manufactured by Bell Laboratories. The resulting crystals were well formed showing clear prism and pyramidal shapes. The hydrothermal method was used. No gemstones were ever available for the market. Clarendon Laboratory also produced crystals of yellow, pink, and orange-red. None were ever made for the jewelry industry.

IMITATIONS

A colored foil backing is put behind the stone of poor color.

It is used in closed mountings where it cannot be seen. Also, in some cases, paint or dye has been added to the back facets to change or improve the color.

There are no accurate records as to when and where the first zircons were found. Throughout history zircon was confused with many other stones. In the Hindu religion, the kalpa tree, a symbolical offering to the gods, was described as a glowing array of precious stones. The entire foliage, except for the young leaves, was formed by zircons. The Hindus also considered the zircon as the birthstone for September. However, at the present time, it is used as the birthstone for December. Zircon is also considered as one of the gems of summer, as well as one of the stones of Mizpah.

Zircons in The Smithsonian Institution include from Sri Lanka: a 118.1 ct. brown, a 97.6 ct. yellow-brown, a 51.3 ct. brown, a 48.2 ct. colorless, a 43.9 ct. pale brown, a 23.9 ct. colorless, and a 23.5 ct. green; from Thailand, a 105.9 ct. brown, a 28.1 ct. brown, a 10.9 ct. blue; from Indochina, a 103.2 ct. blue, a 64.2 ct. brown, a 29.2 ct. blue, and 22.4 ct. brown; from Burma, a 75.8 ct. red-brown; and from Australia, a 21.1 ct. tan. In the British Museum of Natural History is probably the largest collection of zircons of all varieties of sizes and colors. This collection was put together by Sir Arthur Church, who devoted many years toward this project.

HINTS TO THE BENCHMAN

Reaction To:

Setting	Poor
Polishing Mounting	Fair
Torch Heat	Poor
Boiling	Poor
Steaming	Poor
Ultrasonic Cleaning	Fair
Acids	Fair

Heat can cause color changes and damage to the stone.

TURQUOISE

Although there is an abundance of turquoise, most of it is not of gem quality. The finest is an intense medium blue, reminiscent of a clear blue summer sky. The finest blue turquoise comes from the famous mines near Nishapur, Iran and is called Persian Turquoise. Fine turquoise is not cheap.

The Egyptians began mining turquoise in the Sinai Peninsula about 5300 B.C. during the First Dynasty. Turquoise jewelry of that era belonging to Queen Zer has been recovered. It consisted of cast gold and carved turquoise. Recorded accounts describe how many expeditions, some as large as 8,000 men, were sent to work the deposits of turquoise. Turquoise is mined in Iran, Egypt, Mexico, Peru, Australia, and the United States.

Turquoise has been well known in Peru for many centuries. Gold necklaces mixed with turquoise beads have been found in the Lambayeque Valley on the Northern coast of Peru. These were made between 1000 and 1450 A.D.

Mining turquoise in the United States began more than 1,000 years ago. Archeological diggings prove conclusively that successions of culture have been mining turquoise extensively on Mount Chalchihuitl near Sante Fe, New Mexico. In the early 1900s, many old stone hammers, mining tools, and pottery utensils were discovered. In a report by Franciscan Friar Marcos de Niza to his superiors, many passages tell of the beauty and quantity of turquoise which he saw while visiting Indian villages throughout New Mexico. During religious processions and ceremonies, treasured gifts of turquoise were always in abundance. Other states where turquoise has been found are Texas, Arizona, Colorado, Nevada, Virginia, and California. However, in these states mining is not

extensive because the turquoise is soft and porous. Most of the turquoise mined in the United States contains some of the matrix in which turquoise is found. This matrix is a black, brown, or yellowish limonite, forming veins in the turquoise. Some consider this cobweb effect beautiful. I do not. During the past 15 years, large quantities of silver turquoise jewelry were sold throughout the United States. I think it was the most overpriced and most misrepresented jewelry ever sold.

The name turquoise was first used in the 13th century. The name is derived from the French "pierre turquoise," meaning stone of Turkey. Although none has ever been mined in Turkey, it was originally sold in all the Turkish markets.

Turquoise is an hydrous copper - aluminum phosphate. The chemical composition is $Cu Al_6 (PO_4)_4 (OH)_8 5H_2O$. The blue color is caused by the idiochromatic copper content. Sometimes the alumina is replaced by ferric oxide. When free of iron, it is various shades of blue. Iron imparts a greenish shade to the color, sometimes so great that a yellowish-green or apple green color results. Polished surfaces are waxy to vitreous, while fractured surfaces are waxy to dull. On the Mohs scale of hardness, turquoise is 5 to 6. As for toughness, fine quality turquoise is fair to good, while chalky material fractures easily. The refractive indices are 1.61 and 1.65. Turquoise is biaxial positive. The specific gravity of Persian turquoise is 2.75 to 2.85, while other turquoise can vary from 2.31 to 2.81. Most turquoise is very porous and should be treated with extreme care. Oils, dirt, perfumes, an contact with hard surfaces should be avoided.

In 1609, Anselmus De Boot, the court physician to Rudolph II of Germany, believed that the spirit of evil exercise its power on us through turquoise. A French writer believed that her turquoises became as pale as death when she did not wear them. Emperor Charles V believed that if you should fall from a high tower, the turquoise would remain unbroken. In 1905, a turquoise pendant rudely fashioned in the form of an ibex, was found by a German Orient-Gesellschaft at Abusir el Meleq. It was from the Old Empire, 3500 B.C. In the 13th century it was believed that turquoise protected the wearer from falls from buildings, horses, or precipices. The Persians considered turquoise to be one of their most treasured possessions. They believed that to escape evil and attain good fortune, a person had to see the reflection of the new moon either on the face of a friend, on a copy of the Koran, or on a turquoise. The Montezuma Indians considered turquoise such a strong part of their religion, that possession of the stone by foreigners was met with strong disapproval. According to Indian warriors or hunters, if a turquoise was affixed to a gun or bow, the shot would go straight to the mark. According to the Hindu mystics, one would enjoy immeasurable wealth, if you cast your eyes upon a turquoise after first looking at the moon on the first day after the new moon. In the book of dreams, written in the 8th century, anyone dreaming of turquoise will be prosperous. It is one of the acrostic stones of dearest. It is also the gemstone of Iran.

SYNTHETICS

Synthetic turquoise was first produced by Gilson in 1972. There are two types, one with matrix and the other without matrix. The specific gravity was 2.72. The index of refraction was 1.604. The medium blue color is called "Cleopatra" and the darker blue is called "Farah". Syntho Gem Company produces a "simulated turquoise". Adco products has a reconstituted turquoise and Turquite Minerals produces a Turquite. Gilson comes closer to the natural than any other stone, but has a lower iron content.

TREATED

Much of the turquoise mined today has very little value because of its inferior quality and color. Some pieces have

(Please turn to page 29)



Elizabeth Brehmer

Trends of Style Channel Settings

Fashions come and go, season to season, year to year. New styles and old designs are mixed and matched in a constant seasonal rearrangement. This seems to be a never-ending process in the fashion industry, both in clothing and jewelry. There is always a new piece of fashion jewelry to match the latest outfits. Industry magazines have an unending supply of young, fresh designers and ideas.

In thumbing through all of my past issues of jewelry magazines, I've discovered an interesting fact behind new designers. The techniques that they use in designing their jewelry pieces also run in cycles. Most jewelry techniques are very old and traditional, but new designs blend many different styles of setting techniques. Channel setting seems to be the hottest of the techniques used in the latest styles. This observation is based on the fact that channel setting has survived strongly through at least four full seasons of fashion, and seems to still be going strong. Unlike some of the other techniques of setting, channel setting does very well when it comes down to being an independent, strong design technique. Designwise, it can stand on its own. Channel setting can be done in a way that makes the piece look heavy or light and delicate. Channel setting covers a full range of styles and is very adaptable.

Channel setting demands a great deal of patience and skill from the setter. This technique does not allow for errors in layout or seat cutting. It is a precision setting form. There are several variations in channel setting: one is an open-set channel set, a suspended channel set, a closed channel set, and a flush-bottom channel set. Before discussing any technique, allow me to further explain these forms of setting.

An open channel setting (Figure 2B) is one in which the stone is open on two sides: the table area (top) and the pavilion area (bottom). There are usually two bars of metal which are parallel to one another. In some styles of

jewelry, the bars will be lined up in a series and may hold stones on both sides. Good seats and proper tension on the stones are what hold the stones in place. In setting stones in an open setting, the technique of undercutting is used to cut the seats and allow the metal to cover the girdle of the stone on each side.

In undercutting, a seat is cut below the metal's surface and the stone is slipped into its seat. The metal remaining over the girdle is then burnished down to hold the stone in place. Undercutting is done with a 90° bearing bur. The angle of the bur matches the angle of the pavilion and crown facets of the stone and allows the stone to seat tightly and fit properly. In an open setting, the stones are tightened in place by lightly chasing down the metal as well as burnishing.

A different variation on the same technique is done with the same type of undercutting only now the channel has a closed bottom (Figure 1A). This style of channel has a squared-off, U-shaped bottom which encloses the stones on three sides, leaving the top open to the light. The culets of the stones touch no metal; they are suspended just above the flat base. The inner sides of the U shape are highly polished to reflect the stones and give a clean look. These stone tables are all set level with the top of the channel metal.

Another variation on setting stones into the U-shaped channel (Figure 3C) is to set the stones down into the bottom metal of the channel so that only the girdle and crown of the stone are visible. The stones are set so that the base of the girdle is resting just on top of the metal surface. The channel walls on each side of the stone are then burnished or chased into the stones to tighten them in place. Unlike the other forms of channel setting, this particular channel is relatively shallow (about three millimeters in depth). There is just enough metal available to tighten the stones in place and to

Figure 1. Closed setting.

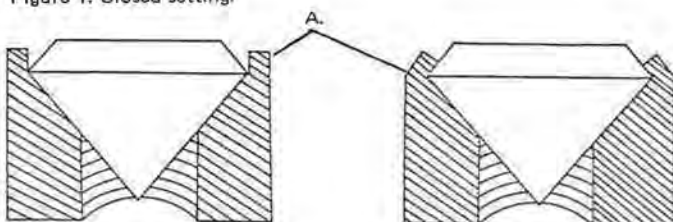


Figure 2. Open setting

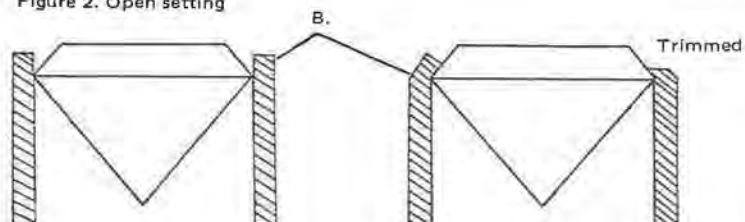
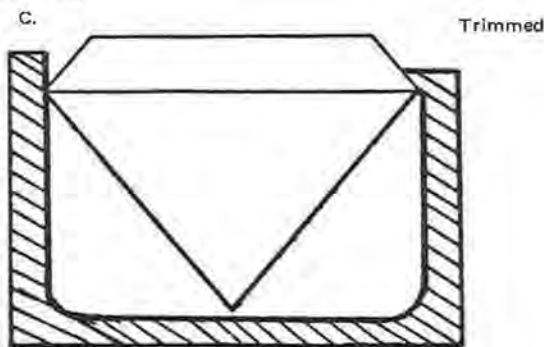


Figure 3. U-shaped setting.



dress off the channel top.

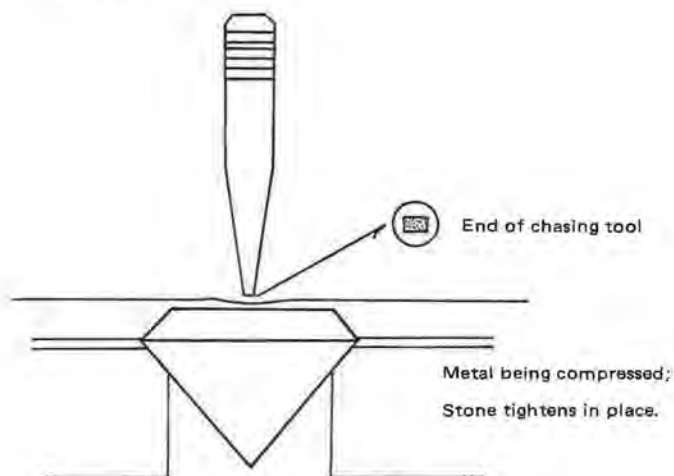
Here are the step-by-step techniques of the different types of channel setting:

When preparing to set an open channel set piece of jewelry, it is very important to first check the dimensions and uniformity of the channel. All the edges and surfaces must be square and even in thickness, unless the design is intentionally uneven. Prepolish all inside areas before doing any setting work. These areas will be inaccessible later when the stones are set, so prepolish every recess. Check the height of both bars and make sure that they are equal in height. Take a sharp pair of dividers and scribe a line approximately one mm down from the top edge on the inside of the channel. Carry the scribe line across from one end to the other on both bars. This line will represent the spot where all the seats will be cut. It will serve as a guide for all the stones and seats. It will also serve as a mark where all the stone girdles will lie and will keep all the crowns of the stones the same height. Keep in mind that the crown height of a stone is the vertical distance between the table of the stone and the girdle.

To choose the proper size stone to fit in a channel, it is best to measure the inside distance between the two bars with a sharp pair of dividers. It is obvious that a stone the same size as the opening will not work; it would fall through an open setting. The proper size stone should be approximately two-tenths of a millimeter larger than the opening, so add two-tenths to the inner measure, one tenth for each side. If you have an opening which measures 2.5 mm, a 2.7 mm stone would be ideal in size. However, if you try to use a stone which measures 2.9 in a 2.5 slot there will be too much stone under the metal. When chased or burnished in place there will be too much stone under the metal surface, and burnishing will cause the metal to bump up on the stone and drop down on each side of the stone. The surface will appear wavy and ripply and will not smooth out to an even edge. An excessive amount of stone under the metal will also make the stone appear buried in the metal. When the diameter of the stone has been determined, choose carefully all the other stones to be used in the channel.

1. Table height should match among the stones.
2. Girdle thickness should be constant among all.
3. The diameter of the stones should be the same.

Figure 4. Chasing a channel.



Before setting any stones in the channel of a ring, check the size of the ring. If it needs to be sized, **size the ring now**, NOT after the stones are set. Channels do not tolerate a great deal of change of size once the stones are in place.

The stone girdles can grind together and break the stones or stones can loosen and fall out. Usually it's not just one stone that falls out, but many.

The next step is to choose a bur the same size as the diameter of the stone. If one is not available, use a slightly smaller bur. The top of the plate must now be scribed for placement of the stones. Measure the length of the channel and determine how many stones are to be set in that distance. The stones can sit girdle to girdle or be evenly spaced apart. With evenly spaced stones the extra area should be distributed evenly among the stones. Scribe a center mark where each of the stones should be centered. For stones which are to be set girdle to girdle, measure the overall length of the channel and find the center, for a five-stone channel set the first stone will be seated dead center. Using a 90° bearing bur, tip the bur into the channel (Figure 6) and start undercutting the seat on the one millimeter scribe line. While undercutting, watch the back side of the bur; when it clears the bar bring the back side of the bur down and level the bur off. Lean the bur into the uncut side and cut a notch approximately one half of a millimeter deep. When burring always make the initial undercut on the same side of the channel.

Set the first stone in place (the center stone). From the edge of the girdle of the first stone measure one half of the diameter of the stone plus one tenth of a millimeter to keep the girdles of the stones from grinding together. The stones will appear to touch one another. When burring seats and fitting stones in place, always remember to place the same stone back in the seat that was originally cut for it. When a mounting is made with a curve to the top, make sure to follow the contour of the mounting with the tables of the stones.

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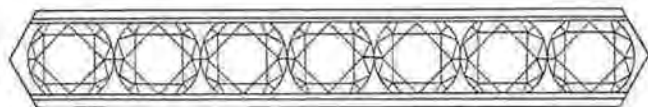
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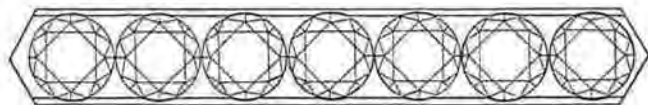
Seat all the stones in their proper seats. A little beeswax pushed up from the backside of the channel will hold the stones in place. With a small flat chasing tool (Figure 4), chase the deepest undercut side of the ring first. The first pass when chasing will be light just enough pressure to start to tighten the stones in place. Do not try to tighten the stones on the first pass. Slowly tighten them so that they can be kept level.

Another method of holding the stones in place is to take a No. 50 graver and slide it down the side of the channel just above the girdle of the stone. This will raise a small bur of metal which will hold the stone in place long enough for it to be properly tightened in place.

Figure 5.



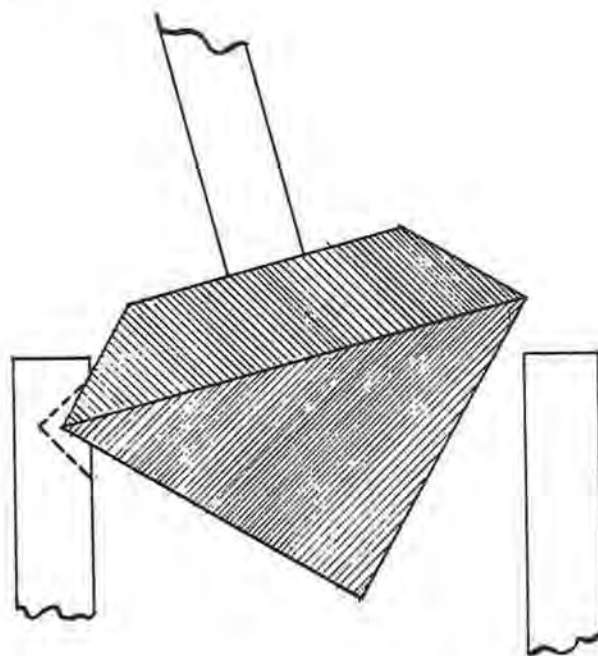
The stones are held into the mounting by the outer metal being burnished evenly over the outer edge of the girdle. The metal must remain smooth and straight over the stones.



The seats should be burred evenly to insure the top of the girdle edge of each stone is at the same depth in the mounting.



Figure 6. Undercutting a channel.



If any shifting of stones occurs during the tightening process, the crooked stone should be straightened at this time. To loosen these stones, use a No. 40-42 flat graver to push against the channel metal parallel with the crown angle. When the metal has been pushed back enough that the stone is loose again, retighten the stone. Equalize the pressure applied to the stone so as to keep the stone straight.

Once the metal is burnished or chased in place, check and make sure that the metal is covering the outer edge of the stone. Each stone must be covered equally and the metal should be smooth and free from any dips or waves. Depending upon the style of jewelry, the channel top can be finished off in several different ways, either by trimming it off flat or by putting on a slight taper outward. (See Figure 5.) A number 6 cut barrette file is the best type of file to use for leveling the metal—it will take small amounts of metal and leave a finer finish on the surface. When trimming the tops of the channels off flat on the top remember to check that they are both evenly cut in height. Tapered channels should have the same degree of taper on each side.

Some excess metal will collect on the inside of the channel just above the stones. To remove the excess, take a No. 40 flat graver or a knife edge graver and run it along the side of the top of the channel just above the stones. This will remove the excess metal, and if the graver is good and sharp it will leave a bright finish which just needs to be touched with rouge and a soft buff to finish it off. Do not over-polish the channel sets. They look their best when the edges are kept sharp and clean. Rounded sides make the channel look over-worked.

By the looks of the latest styles and the consistency at which the channel-set style occurs, it seems as though the channel-set technique has carved itself a stable and comfortable place in the hearts of today's jewelry designer and buyers. Its bold look and solid construction seem as though they will be around for quite awhile—maybe at least until next season!

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TMS

BIRTHSTONES

(Continued from page 25)

been impregnated with plastics to improve their physical quality, while others have been dyed to mask a green or a weak blue color. A stone which has been stable for some time will usually remain so unless abused by abrasion, heat, oil, or dirt.

IMITATION

Ivory has been treated with copper sulfate to imitate turquoise. The specific gravity is 1.80. White marble, which has been dyed blue or coated with blue plastic, has been used as a substitute for turquoise. Imitations are also made by compressing powdered turquoise with resin. The result has a lower index of refraction, a lower specific gravity and is softer. Glass will display the typical bubbles. Porcelain will display the bubbles as well as a sugary fracture.

SUBSTITUTES

Turquoise can be confused with variscite, chrysocolla, plastic, glass, dyed blue howlite, synthetic turquoise, and treated turquoise.

HINTS TO THE BENCHMAN

Reaction To:

Setting	Fair
Polishing Mounting	Fair
Torch Heat	Very Poor
Boiling	Poor
Steam Cleaning	Fair
Ultrasonic Cleaning	Poor
Acids	Very Poor

Will dissolve in acids — will explode under heat — color may fade if not handled carefully.

TIMES

BUTTNER COMPANY ACQUIRES TIME WATCH MATERIALS, INC.

Time Watch Materials, Inc. of Albuquerque, New Mexico has been purchased by The Buttner Company, Inc. of the same city. Karl Buttner, president of the latter company, has been active in AWI affairs for the past 14 years. He is a Certified Master Watchmaker and served on the AWI Board of Directors for eight years. He also held the positions of second vice-president and secretary of the association. "We are proud to expand our services and supplies to fellow watchmakers in the surrounding regions," Buttner stated.



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THE CONTROL OF FREQUENCY AND TIME IN HYDRO-ELECTRIC POWER PLANTS

(EDITOR'S NOTE: The following information is on a Telechron Type E control clock in use more than 40 years ago in the Pacific Southwest. The movement of this clock is unusual and well constructed. The heavy movement plates, parts, movement mountings, and bezels are gold plated. Mr. Paul M. Zuercher of Denver, Colorado made a gift of a Telechron Type E control clock to AWI ELM Trust and it is on display in their museum in Cincinnati, Ohio. This clock was formerly used in a power house near Heber City, Utah and it served three generators.)

One of the little known features of electric service furnished by our large public utilities is the precise control of frequency. This has made possible widespread use of electric clocks driven by small synchronous motors as a means of obtaining accurate and dependable time.

In the Pacific Southwest the Boulder Power Plant was the largest single power source, and for this reason has unusually fine equipment for the control of frequency and time. For the purpose of explanation, this equipment may be divided into three groups:

1. Waterwheel governors on the individual generating units.
2. The frequency controller for the plant or system.
3. The master clock or basic time standard.

The waterwheel governors were all furnished by the Woodward Governor Company of Rockford, IL and are known as "Type 200". The speed measuring elements consist of flyballs driven by small synchronous motors operating at 150 volts and nine cycles. The power supply for these motors is obtained from permanent magnet generators directly connected to the main shaft of each of the machines being regulated. The mechanical devices for the control of water flow to each of the water wheels



are operated by high pressure oil. These are each rated at 200,000 foot pounds, can make a full stroke in six seconds, and respond to speed changes as indicated by their flyball elements.

Careful tests under various operating conditions showed that each governor could maintain instantaneous speed values within one-tenth of a cycle on a sixty cycle basis from no load to full load. However, to produce stability between units it was found necessary to adjust each governor so that its speed would drop slightly with increased load. This drop of approximately three percent from no load to full load is fine for stability, but is of course objectionable from the standpoint of regulation. To correct this condition it is necessary to introduce the next element, which is known as a frequency controller.

The frequency controller was furnished by the Leeds Northrup Company of Philadelphia, PA and is known as the Micromax type. It is an electrical device containing a frequency sensitive bridge circuit employing resistance and inductance with a galvanometer as the detecting element. This is arranged to send corrective impulses to the control motors on the waterwheel governors to correct for speed drift because of their drooping speed characteristics with increasing load. The device does not

improve the speed regulation of the waterwheel governors, but keeps its adjustment at the proper point regardless of load changes. An important point in the adjustment of the controller is to be sure that the band width of its regulation is slightly greater than that of the governor. This avoids conflict between the two elements, each of which has a job to do, but both of which are limited by the characteristics of the main generating unit. The governors and controller, working together, do a job of regulating instantaneous frequency, but they do not correct for time lost or gained because of sudden load changes. This brings in the third element, or master clock.

The master clock was furnished by the Telechron Clock Company of Ashland, MA, and known as the Warren

type E. It is a precise instrument of the free-swinging pendulum variety and is fully compensated for temperature variations and other possible errors. It is installed in a special room in the power house, the floor of which is integral with the dam and not subject to vibration from plant machinery. The room is kept at a constant temperature of 85° F by the use of special air conditioning equipment.

The function of this clock is to correlate instantaneous and integrated time and correct any deviation. This is accomplished by a differentially operated potentiometer which puts a bias on the bridge circuits in the controller and holds its adjustment at the desired point. The equipment is checked for accuracy three times daily by reference to Arlington time signals. This is done by an audible

method which combines the beat note from the Arlington radio transmitter, with a beat note obtained from a local oscillator and synchronous motor driven contact. This makes it possible by any visual method.

The equipment is sturdy, reliable, and operates with a high degree of precision. The normal deviation from true time seldom exceeds two-tenths of one second in a 24-hour period. A graphic record of the error, if any, is kept at the power plant, and information can be furnished as to the deviation at any particular time. This close control of frequency and time on systems supplied or interconnected with the Boulder Power Plant has led to a more general use of electric clocks than most people realize.

W.D.F.

QUESTIONS AND ANSWERS

(Continued from page 12)

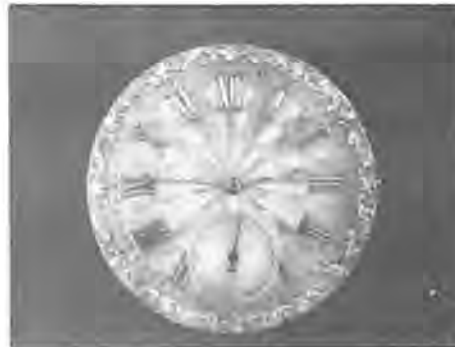
A The Vacheron Constantin pictured in your photo is one of the highest grade of watches made at that time (c. 1890).

To disassemble the barrel unit, place the points of a spanner wrench in each hole of the barrel arbor and unscrew that part. It will unthread itself from the rest of the barrel arbor, releasing it from the barrel bridge. (While doing this you must secure the other end of the arbor so that it doesn't turn and resist unscrewing the flange.)

As for mainsprings, you can obtain the gauge of the spring from that which is inside the barrel. Replacement springs aren't available. However, you can remove the endpiece from the old one and rivet it to the new spring which is available with the width, thickness, and length.

Q I need some information on a watch. It has a "compensating curb." It is quite unusual—it is a bimetallic arm that throws the regulator pins apart or closer together for temperature changes.

Under the dial is scratched "F.H. Fry, 112 Main St., Burlington, NJ." It has a dia. cap jewel. Also, there is an outside slide on the case which I believe



was to operate a lever to stop the balance (probably to set the second hand?).

The dial has a fancy cross and crown stamped on it (on the inside). The case has these numbers on it: 3353, IIV, 2210. The dial is a beautiful multi-color gold metal.

Any additional information will be greatly appreciated.

William Dean
Washington, NJ

A I have examined the photos of your watch. It is Swiss. The movement and dial are typical of those made in the town of leLocle, near the French border. At that time (about the 1840s), leLocle was the center of watchmaking. The dial is probably gold, yours being engine-turned. Many others showed engravings of Swiss mountain and lake scenes. These were sold in great quantities to Liverpool exporters who sold them to the trade in the USA and in England, being cheaper than the home product. However, the quality of your watch is good. The legends on your case and dial are unfamiliar to me. They do not seem to fit into the Swiss markings of karat gold, but may be some local stamping.

Henry B. Fried

W.D.F.



WATCH TESTING WITH THE CITIZEN MULTITESTER CMT 3002

Calvin E. Sustachek



WATCH TESTING EQUIPMENT

This multitester (Figure 1) is a voltmeter specifically designed for testing watches and clocks. It uses a 1.5 volt penlight battery to supply power for resistance testing. It has a D.C. voltage and a D.C. amperage scale for measuring voltages and current of battery-operated watches and clocks. It also has an A.C. voltage scale for measurement of voltage of electric clocks. The selector switch panel and the meter dial are color coded to aid in determining the scale to be observed for the proper reading.

The meter has a special adaptor to increase the capability of the testing that can be performed. This adaptor is designed to accommodate a watch cell, a 1.5 volt C or D size battery, or a variable power supply (VA-37, Figure 2). A D.C. voltage can be extracted from the meter to supply external constant or variable voltage. The variable power supply uses two penlight batteries and has the ability to supply variable voltage to three volts. It fits into the well of the adaptor where a D size battery would go.

BATTERY TESTING

The power cell for a watch can be tested in two ways with this meter. It can be tested in the adaptor or it can be tested directly from the meter.

1. To test the cell in the adaptor, Figure 3:
 - a. Insert it with proper polarity (plus down)
 - b. Set rotary switch to DC V3

- c. Set snap switch (white one on adaptor) to battery check DC V
- d. Read battery voltage on 0 to 3V division (black) on the scale plate

NOTE: DO NOT insert two batteries in the adaptor at one time. INACCURATE READING WILL BE INDICATED!

2. To test directly from the meter,

Figure 4:

- a. Remove the adaptor
- b. Insert the leads in the plus and minus terminals and apply to the power cell
- c. Select the meter DC voltage range suitable to read the output voltage of the cell

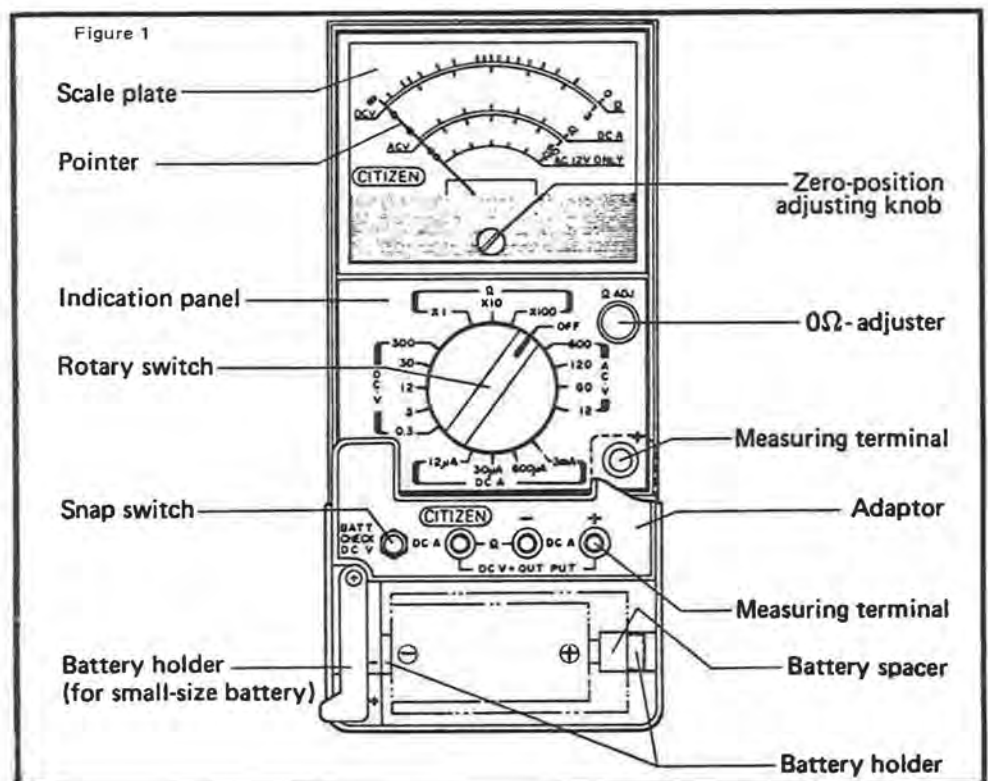


Figure 2

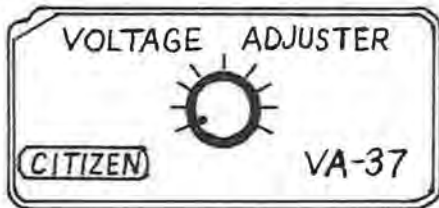


Figure 3

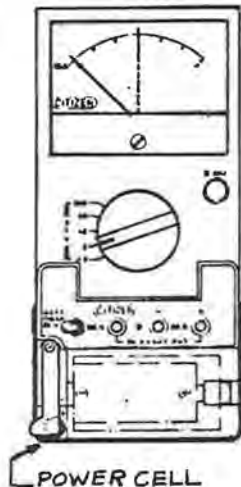


Figure 4

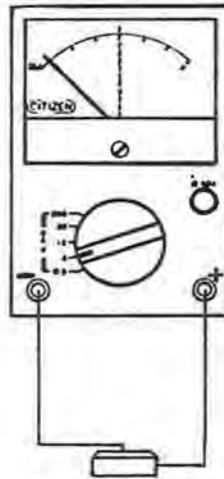
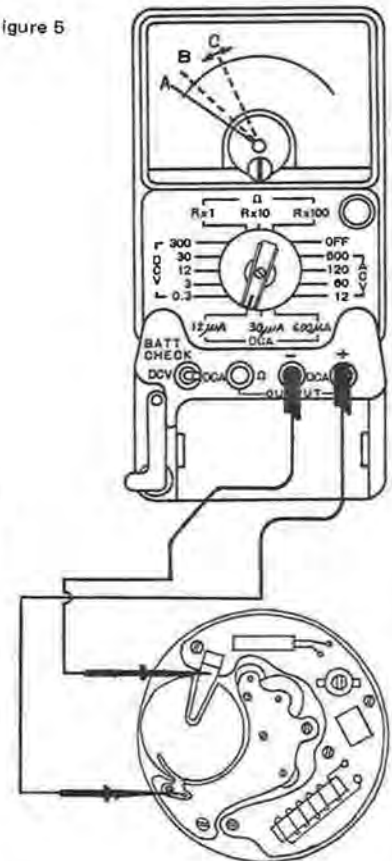


Figure 5



- b. Leads may be broken, check for continuity of leads
 - c. A screw or screws on the circuit board may be loose; check—especially the ground screw
 - d. Corrosion between contacts not allowing continuity
 - e. Circuit board may be bad and need replacement
2. Low steady reading (B in Figure 5): This reading indicates that current is flowing into the circuit and the quartz crystal is oscillating but the current is not flowing through the motor coil.

CURRENT CONSUMPTION

Power for the current consumption test must be supplied externally from the watch. **There should be no cell in the watch.** The power can be applied using a good watch cell in the adaptor, or by use of the variable power supply with the voltage set to 1.5 volts. A watch cell and the voltage adjuster should not be used at the same time.

See Figure 5.

1. Set rotary switch to current range DC-A (most cases 12 A on the green scale).
2. Set snap switch on the adaptor to DC A (green position).
3. Connect test leads to DC A (green) terminals on the adaptor, red to plus, black to minus.
4. Apply red lead to the positive (+) and the black to the negative (-) terminals of the watch. Observe the current consumption on the green scale of the meter. Sometimes it is necessary to go up to a higher scale initially because of current surges. Current consumption varies with different model watches. Older models use higher current, newer ones use lower. Refer to the service manual for correct values.

When measuring, there can be three possible readings of current consumption that will tell the condition of the watch.

1. No reading on the meter (needle remains at zero), A in Figure 5.
 - a. Leads may not be connected properly; recheck

WATCH MAKERS



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- a. The stem may be in setting position and shutting off the current flow beyond the circuit board (a normal condition on many watches).
 - b. There may be a loose screw or no connection being made between the circuit board and the motor coil.
 - c. There may be an open circuit in the motor coil, i.e., the wire from the contacts to the coil may be broken or the coil itself could have a broken wire in it.
3. A slightly wavering of the needle (C in Figure 5) with each pulse from the circuit board. This is the correct indication of a properly operating circuit board and motor coil. Keep in mind that this pulse takes place at different intervals depending on the design of the watch. A watch with a second hand will have a pulse every second; watches without can have these pulses at 5-, 10-, 12-, 20-, 30-, and 60-second intervals. A watch with a longer pulse interval will have a current reading that goes up to its peak and slowly settles back toward the lower current value of the circuit board. This is due to the damping of this meter.

PULSE TEST

Pulse testing of a quartz watch is done to determine whether there is an output from the integrated circuit of the electronic assembly. This is measured at the terminals of the electronic assembly where the motor coil is connected (Figure 6).

For this test the power cell must be installed in the watch and the adaptor removed from the meter.

1. Connect meter leads to positive and negative jacks of the meter.
2. Set rotary switch to 0.3V DC (black scale).
3. Touch meter leads to the terminals on the circuit board to which the motor coil leads are attached.

The meter needle will alternately swing positive and negative (A in Figure 6) with each pulse with a good coil. If no pulsing is indicated make sure that all electrical connections are tight before concluding that there is no output. On watches that have long intervals between pulses, be patient; a pulse in the minus direction could be overlooked because there is little room for the meter needle to move in that direction.

On some watches it may be necessary to remove a magnetic shield to get to these terminals. It may also be necessary to replace the screw that holds the magnetic shield to establish a proper electrical connection on the circuit board.

LOW VOLTAGE RUN (LVR)

To check a quartz watch at a reduced voltage is simply a test to see if the mechanical portion of the watch is functioning properly. It is similar to winding a mechanical watch only a couple of turns and observing the motion of the balance wheel.

The low voltage run is done the same as the current consumption check, except the voltage is adjusted to lower values to observe the operation of the mechanical part of the watch; i.e., the train and the calendar mechanism. The voltage adjuster VA-37 (Figure 2) provides this capability.

- a. Assemble the adaptor and the voltage adjuster to the meter.
- b. Turn snap switch on the adaptor to "Batt check DCV."
- c. Set meter rotary switch to 3 on DCV scale.
- d. Adjust voltage adjuster knob until 1.5 volts registers on the meter dial.
- e. Change meter rotary switch to 12 micro amp current scale.
- f. Change snap switch to DC-A.
- g. Insert leads into D.C.A. terminals on adaptor.
- h. Attach test leads to watch positive and negative terminals (no cell in watch)
- i. Reduce the voltage on the voltage adjuster until the watch train stops
- j. Switch the rotary switch to 3 DCV
- k. Return snap switch to "Batt check DCV"
- l. Record the voltage that is displayed on the meter dial.

Compare this lower voltage value to the L.V.R. as specified in the service manual. If the recorded value is too high, this is an indication of a mechanical restriction in the train and steps must be taken to correct it. Low voltage values differ for each watch; so no set low voltage can be established for all watches.

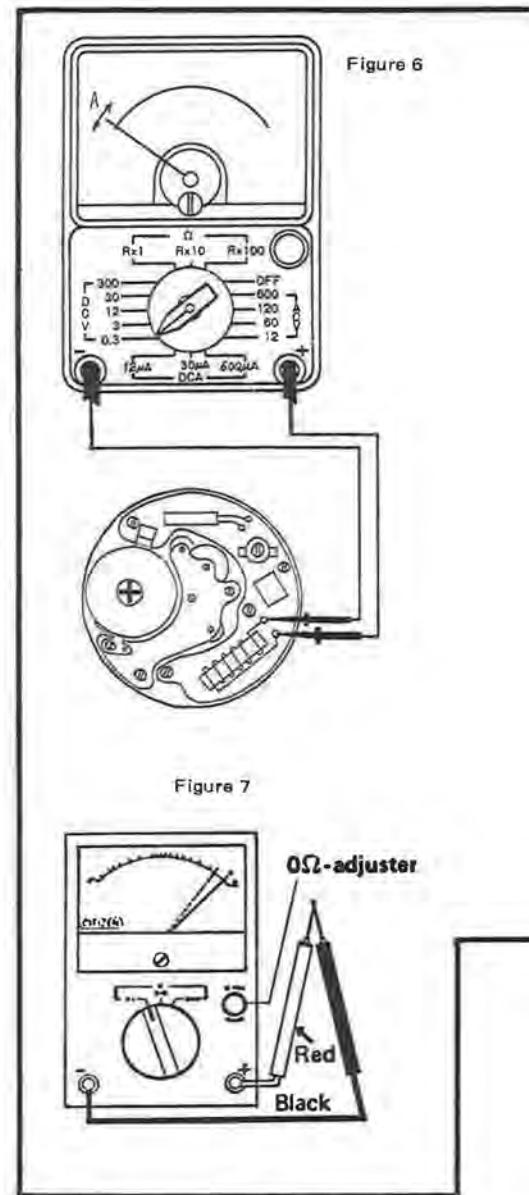
RESISTANCE MEASURING OF COIL COIL INSULATION TESTING

These two tests can be done simultaneously because the testing is being done on the same component. There are three conditions of the motor coil that can be determined: 1) good, 2) open, and 3) grounded.

When the motor coil can be separated from the electronic assembly, the ohmmeter can be used to measure the resistance of the coil, or the resistance to ground. First the ohmmeter must be adjusted by touching the leads together as shown in Figure 7 and adjusting it to zero by means of the 0-ohm adjuster.

The leads are then touched to the two leads that go into the motor coil (coil disconnected from circuit board) and the resistance can be measured. If it indicates the resistance specified in the service manual, it is good. If there is no reading, it is open.

To check for a grounded coil, one of



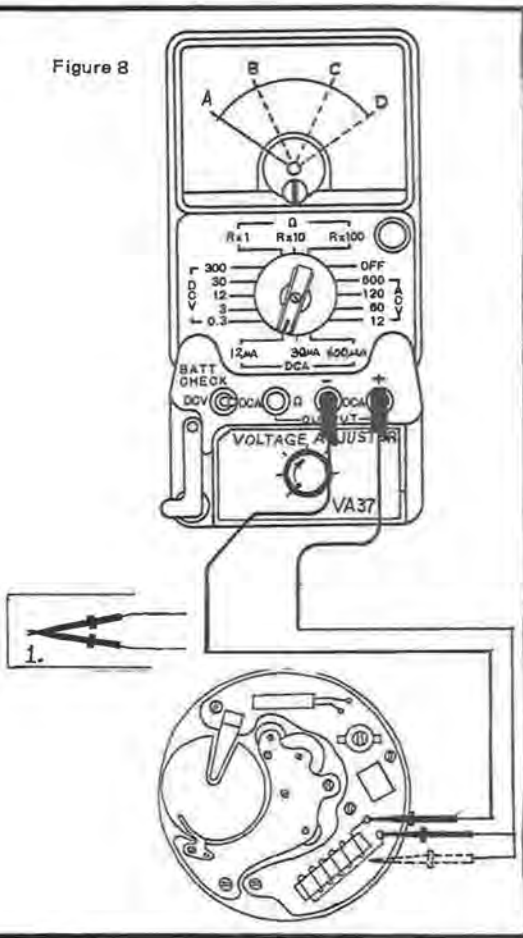
the probes must be touched to the metal core of the coil or the plate of the watch while the other remains on either terminal of the coil. If there is an indication of a resistance reading, the coil is grounded and must be replaced.

COIL TESTING—ALTERNATE METHOD

There is a way to check the coil while it is connected to the electronic assembly. This is necessary because many coils are permanently fastened to the electronic assembly and cannot be separated. Set the meter, adaptor, and voltage adjuster as shown in Figure 8.

1. With the leads touched together (Figure 8, insert 1), adjust voltage knob until the meter needle reaches full scale (Point d). This establishes a reference and sets up a very low voltage. This voltage, when applied to the motor coil leads while connected to the electronic assembly, is not high enough to allow a current flow into the integrated circuit. It only allows current flow through to coil.
2. Apply the test probes to the motor coil leads as shown in Figure 8.

Figure 8



- a. If coil is good, the meter needle will indicate somewhere between points B and C on the meter scale.
 - b. If coil is open, meter needle will remain at Point A.
3. To test the coil for ground, retain one test probe lead on one coil terminal and touch the other to the coil core or watch plate as shown by "Dotted Line" probe in Figure 8.
- a. If coil is not grounded, meter needle will remain at Point A.
 - b. If coil is grounded, meter needle will go to a point between A and D, depending on the location of the ground. This indicates that coil wire is touching the core, is grounded and must be replaced.

CONCLUSION

The tests described in this procedure permit the repairman to utilize a specially designed multimeter to test all conditions of a watch and determine what action must be taken to correct them.

TIMES

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Milton C. Stevens

AWI BRIEFS

With the completion of this, the December 1985 issue of *Horological Times*, Mr. Maury Norrell will retire as Managing Editor of the magazine. Upon reaching the magic age of Social Security, Mr. Norrell has decided to return to his former home in Denver, Colorado.

Mr. Norrell came to *Horological Times* about five years ago after serving in a similar capacity with the *Watch and Clock Review* (formerly *AH&J*) magazine in Denver, Colorado. Prior to that, Maury Norrell enjoyed a long and successful career with publications in the (then bustling) aero-space industry in California.

During his tenure with AWI, Maury Norrell has put his magic with words to work in the preparation of many AWI news releases, brochures, bulletins, and other published matter. We wish Maury and his wife, Gay, a long, happy, and healthy retirement!

The departure of Mr. Norrell has prompted some shifting of responsibilities among the current AWI staff. Regina Stenger, who has been serving as Art Director, will take on the expanded duties of Associate Editor. Miss Stenger's additional responsibilities will include the entire production phase of the magazine while the editorial content will remain under the direction of the current editor, Hal Herman. Mr. Herman and Michael Danner will assume the advertising responsibilities which were formerly handled by Maury Norrell. I am confident that *Horological Times* will continue to maintain its reputation for excellence under this new management team.

AWI MANAGEMENT SEMINAR MAKES A SUCCESSFUL DEBUT

AWI's new two-day "Management Seminar for Jewelers and Watchmakers" made its debut in Boston, Massachusetts, October 20 and 21. Fred Burckhardt, AWI President, served as the instructor. Mr. Burckhardt called upon his more than 40 years of experience in the jewelry business (20 in management) as he presented the nine basic topics of the course, namely:

1. Management
2. Time Management
3. Staff
4. Marketing
5. Buying & Selling
6. Advertising—Public Relations—
Image Building
7. Repair Department
8. Store Security
9. Legal Responsibilities

Fred Burckhardt has conducted similar programs for local professional groups and colleges in the past. The course notebook which is given to each course participant will continue to serve as effective reinforcement for the material covered during the seminar.

Evaluation sheets completed by the participants indicated that this course fills a vital need for many AWI members. Each participant gave the course content and instruction high marks on their individual evaluation sheets. Mr. Burckhardt has designed the course to provide each participant with a competitive edge as the coupe with the rapidly changing management problems faced in our industry today.

The Management Seminar has been scheduled twice for early 1986. It will be held in San Francisco, California, February 16 and 17; and in Greensboro, North Carolina, April 20 and 21. A brochure giving complete details about the seminar is available from AWI Central.

Individuals and groups who would like to have this seminar scheduled in a location near them are encouraged to express that interest to AWI Central. We will attempt to schedule this refreshingly new seminar for watchmakers and jewelers in an area close to you during 1986.

ANNUAL MEMBERSHIP RENEWAL

By the time most *Horological Times*' readers receive this December issue, they will have already received their statement for annual dues for 1986. The only exception to this will be those individuals who are not currently on a first-of-the-year billing basis. As I write this article for the December issue, many members have already responded, and we have their checks for membership renewal already.

It's no secret that changes in our industry have resulted in diminished membership among most horological associations. AWI is no exception. We have trimmed costs to meet the challenge of fewer members and are confident that we will be able to offer the same valuable information and services members have come to expect from the Institute.

One thing members can do to assist in trimming expenses is to pay their annual dues promptly upon receipt of their statement. This will eliminate the costs of extra labor and postage which results when a member must be billed three times before payment is made. We will welcome your cooperation in this matter.

AWI MEETINGS TO BE HELD IN FT. WORTH, TEXAS — JUNE 1986

In keeping with the request of AWI Affiliate Chapter delegates to hold the AWI annual meetings at a location other than Cincinnati, Ohio at least once every five years, the Board of Directors has approved Ft. Worth, Texas as the location for the 1986 meetings. The Research & Education Council will meet June 23-26; the Affiliate Chapter delegates will meet June 27; and the Board of Directors meeting will be held June 28 and 29.

We hope that by announcing the dates and location early, members living in and near the area who usually do not attend will make plans to do so this year. That was the purpose of the delegates when they recommended moving the meetings around at least once every five years. The last time the meetings were moved they were held in San Francisco, California in 1980.

VIDEO TAPES

Since my article in the last issue of *Horological Times* about new video cassette programs offered by AWI I have had an opportunity to review several others. One very commendable effort which I will discuss in detail next month is a cassette dealing with the repair of a count-wheel striking clock. The two-hour program is done by Wayne Griffith, an AWI Certified Master Clockmaker in Murfreesboro, Tennessee. We have learned of other programs, including at least one more from Mr. Griffith which we hope to review and eventually make available to AWI members during 1986. It seems that suddenly video cassettes have emerged as a very viable way of communicating technical information. More on this next month.

HAVE A SAFE AND HAPPY HOLIDAY SEASON!

WHS

FORMER BULOVA STUDENT WINS DICK LANG AWARD

The Dick Lang Award, presented each year to the individual who receives the highest grade on an AWI Certified Master Watchmaker examination, went to Zekiel Mabaso.

Mr. Mabaso took the examination while he was completing his studies at the Joseph Bulova School of Watchmaking in Woodside, New York. Mabaso is a citizen of South Africa and returned to his country after completing his training at the Bulova School; he presently resides in Soweto, South Africa.

In addition to receiving a personal plaque of recognition, Mabaso's name has been inscribed on the large Dick Lang Award plaque which hangs in the office at AWI Central.



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Affiliate Chapter Column

David H. Fryday



Where are the New Members?

Many Affiliate Chapter reports were given by the delegates at the AWI annual meeting this year. Of all the issues discussed, none had greater importance to the local organizations than that of maintaining their memberships. With more watchmakers retiring than are taking up the trade, we must examine the membership of our local guilds. Then we must prepare ourselves for the hard work ahead to increase membership, thereby keeping our local organizations functioning and healthy.

MEMBERSHIP. Maintaining membership can be accomplished in two ways. First by bringing in new members and second by keeping existing membership. Some of our affiliate chapters have been successful in this effort, but many more have not. In the present and future articles we will discuss such topics as how to attract new members, how to retain interest in the organization, and what the growing guilds have done right.

THE SALE. To give us a framework to help understand the process of gaining membership, we can draw an analogy between a membership drive and that of making a sale. If a salesman wishes to convince a customer to fix his watch or buy a new one, the salesman will often proceed through part or all of the sequence of a customer's 1) curiosity, 2) interest, 3) need, and 4) decision.

Curiosity is the desire to learn about something. Curiosity about a service or product can be created by the visibility and image of a store's appearance and advertising, or salesman's demeanor and presentation. Interest, the feeling or attitudes aroused by someone, can be accomplished by what the salesman tells the customer about his service or product. Need, the requirement of something wanted or necessary, can be ascertained by how the salesman listens to his customer and matches what he has to offer with his customer's special circumstances. Finally, he must ask the customer for the sale, thereby obtaining a decision, the act of making a judgment.

CURIOSITY. If the salesman wishes to make a sale, he must get the attention of a customer. When attempting to win new members, we likewise must attract eligible prospective members to our meetings and then sell them on our organization. To create curiosity in our guild, we must have visibility and create an image for our organization. We must capitalize on people's desire for companionship. In looking

for new members, our guilds are in competition with other clubs, organizations, and with the recreation time of our potential members. Therefore, our publicity committees must advertise effectively to gain the attention of eligible craftsmen and bring them to our meetings. We can promote our events in AWI's *Horological Times*, distribute flyers through the material houses, and notify our regular members to bring guests to the meetings. If we personally have the time, a very effective way to bring in potential members in our area is through direct contact with them, and by supplying them a complimentary copy of a recent newsletter or flyer. This should be followed up with a note or a phone call and a personal invitation. If we have a promotional budget we should consider the media. Advertising in television, radio, local newspaper, or regional trade magazines may be effective in reaching our target audience. If we lack an advertising budget, it would not hurt to ask for a public service announcement.

General curiosity about our organization can be enhanced by how we present ourselves. We must speak highly of our guilds and not get bogged down with petty personality conflicts or minor disagreements. We need to operate our businesses in an ethical and profitable manner using the professional education gained in our meetings. The curiosity about our business practices can be transferred to curiosity about our organization. The access to recruitable members can be improved by such methods as developing meetings at convenient times and central locations, arranging for meals at long meetings, and keeping meeting costs reasonable.

INTEREST. Once a salesman has his customer's attention, he must describe what the product is and what it does. Similarly, once we have drawn a prospective member into our meeting, we must describe the purpose and goals of our organization. Primary responsibility to accomplish this falls on the membership committee who must exhibit the warmth and interest of the organization. All too often prospective members refuse to sign up because they feel unwelcome. Supplying name tags at meetings helps guests; new members and others recognize one another. Everyone entering the meeting should be greeted at the door and an introduction should be made during the meeting which will serve to identify those who are new. After the meeting, a phone call to those prospective members who attended confirms our interest in their membership.

The Board of Directors and the Officers have responsibility to help maintain interest by reviewing the programs scheduled for meetings. Good programs lead to interesting meetings. These officers and the Program Committee also have the responsibility of running a smooth meeting. Keeping an eye on details such as the arrival of the film or slide show, the verification that the projector runs properly and the availability of a viewing screen will assure that the presentation will not be a major distraction to the theme of the meeting. If a speaker is going to be utilized, make sure that he knows the topic, time frame, and that he is extended every courtesy. For further amplification on running a smooth and successful meeting, ask AWI Central for Fred Burckhardt's "President's Guide." A well-run meeting with a warm milieu will create a good impression on guests and it will be more likely that they will become interested in joining your group.

NEED. If a customer shows interest, the salesman must find or clarify the customer's need for the product. We must communicate to the prospective members why they need us. The many benefits for our members must be enumerated. One of the benefits includes meetings sponsored by the guilds such as educational bench courses, discussions in round tables, or seminars with featured speakers. Members have the opportunity to exercise leadership and volunteer time in our organizations. Additionally, our guilds offer fellowship at regular meetings as well as the planned social functions. All of these can provide a sense of camaraderie. The members of your organization may write a newsletter which highlights local events, or they could provide a membership certificate which could be displayed at each member's place of work.

Perhaps the prospect is only interested in one or two aspects of your organization. You must ascertain what his needs are. The best way this can be accomplished is by listening. A sales motivational speaker once said, "You were given two ears and one mouth. Use them accordingly." We will never find out what the prospect's needs are if we go on endlessly gabbing about our guild's fine points. After you have made the presentation about the purpose and goals of your organization, carefully and completely answer the prospect's questions about how your guild can fulfill his needs. If his questions are answered, any of his reservations about joining should be eliminated.

DECISION. Finally, the salesman must ask the customer to buy the product. For most of us, asking the prospect to sign up is the hardest part of the sale. Occasionally someone will call you and say, "I want to join. How much do I send in?" This is wonderful when it happens, but it will not happen often enough to keep your group vital. More often, however, your new members will be found by persuading them to join at meetings. An active approach will be effective; a passive one will not. Many times an interested but shy person attends an organization's meeting several times and is not seen again because, "No one asked me to join. I decided that they did not want me." After letting the prospect know that the organization needs him and can help him, sign him up. If he balks, ask him directly what his reservations are. If you cannot answer these objections, call in a longstanding member or officer to help you answer his questions. If he understands what your organization has to offer him, he will join.

If you contact prospective members outside the organization, make sure you always have a membership application with you. The application should summarize the advantages and attributes of the organization. Always leave the application if the person does not sign up on the spot. Call back in a day or two to follow up. Remember, every new member will strengthen your organization. Do not resist the urge to ask people to join today.

SUMMARY. In answering the question posed by the title of this article, eligible craftsmen are in shops and stores all about us. In order to bring in new members, all we must do is actively campaign for their membership. The future and vitality of our organizations depend on the success of our efforts. The Publicity Committee must make our organization and our meetings visible. Interest can be created by our program committee developing dynamic meetings and the officers seeing to it that the meetings are well run. The membership committee must explain the benefits of the organization to guests at meetings and elsewhere finding out what the prospective members need with regard to the trade.

Last, but not least, we all must be ready to ask these eligible men and women to join us. If we vigorously pursue this course, we can, in short order, revitalize our ranks and look forward to many years of service to our fellow watchmakers, clockmakers, allied craftsmen, and to the community at large.


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Seiko Presents Medal of Honor Watches

In a special tribute, Seiko Time Corporation presented a custom-designed watch to the 249 living Congressional Medal of Honor recipients. Seiko vice president Don Larsen presented the first of the numbered series of timepieces to Ronald E. Ray, president of the 1985 Medal of Honor Society. The watch will be prominently displayed at the Medal of Honor Society Museum in New York City on the aircraft carrier Intrepid.

The Seiko presentation was made recently in Myrtle Beach, South Carolina, on the occasion of the 1985 Biannual gathering of the Medal of Honor Society members. At the presentation, Larsen spoke of the bravery of

the select group of people. "Seiko is proud to be able to add to the honors you have already received and to thank you for your courage and self-sacrifice."

The Seiko Congressional Medal of Honor watch is encased in a rosewood box bearing the Congressional Medal of Honor seal and protected by a soft cloth pouch.

Among the distinguished guests at the gathering were Richard Riley, Governor of South Carolina; Erick B. Ficken, Mayor of Myrtle Beach; Senator Strom Thurmond of South Carolina; the Honorable John O. Marsh, Jr., Secretary of the Army; and General William Westmoreland.



Seiko's custom-designed watch presented to the Congressional Medal of Honor recipients at the Society's recent biannual gathering.

AJDA-JIDA CO-MEETING TO BE HELD IN MARCH

The first co-meeting of the American Jewelry Distributors Association and the Jewelry Industry Distributors Association will take place March 18-23, 1986 at the new Palm Springs Marquis Hotel in Palm Spring, CA.

Both organizations share the common market of jewelry retailers and have planned their programming to discuss shared industry issues and business opportunities. The meeting will include a one-day merchandise show for suppliers and distributors, a full morning seminar on marketing distribution services, and other sessions on business-related subjects.

Interested jewelry suppliers and distributors who are not members may apply to either organization for membership.

ARTHUR WATCH & CLOCK EXHIBITION HELD OVER IN COLUMBIA, PA

The exhibition of "Highlights of the James Arthur Watch and Clock Collection" at the Museum of the National Association of Watch and Clock Collectors in Columbia, Pennsylvania, has been extended through October, 1986. Visitors who are interested in making furniture should especially be interested in the examples of clock cases made by Mr. Arthur in the first decade of this century to house clock movements that he had obtained. In some instances, Mr. Arthur also made the metal or wooden movement that he cased. James Arthur was one of America's earliest collectors.

The Museum is open year-round Monday through Friday from 9 AM to 4 PM, Saturdays

9 AM to 5 PM. Admission is charged.

JAGER JOINS CASIO AS ANALOG PRODUCT MANAGER

Steven Jager has joined Casio, Inc. as Analog Product Manager, Timepiece Division. Mr. Jager reports to Casio Vice President, Gary A. Smith.

Before joining Casio, Mr. Jager formerly held positions of Product Manager, Pulsar Time and Assistant Merchandising Manager, Seiko Time Corporation. Both firms are divisions of Hattori Corporation of America.



Steven Jager
Analog Product Manager/Casio

PULSAR NAMES AWARD WINNERS OF NATIONWIDE "LEAP SECOND" CONTEST

Pulsar Time recently announced the ten prize-winning responses to its nationwide "Leap Second" contest held earlier this summer to commemorate the solar phenomenon of the 61-second minute that occurred on Sunday, June 30th, at exactly 7:59 PM, EDT.



Arthur J. Cohen (left), president of Pulsar Time, presents a Pulsar watch to George M. Hallinan of West Paterson, NJ, first prize winner in Pulsar's "Leap Second" contest.

Grand prize winner was George Hallinan of West Paterson, NJ. June Bruno, of New Orleans, and Starr Shelly, of River Ridge, LA, were selected as the second and third prize winners. Each of the prize winners will receive a fashionably-styled Pulsar quartz wristwatch. There were seven runner-up prize winners.

In the contest, Pulsar asked the public to respond to the question, "What would you do if you had a spare second?" On June 30 we had a spare second due to the slowing down of the earth's rotation, and scientists determined a correction of this solar phenomenon be made at this time. They have been regulating this spare second episode every year since 1972, except for the leap years of 1980 and 1984.

All responses to the question had to be answered in 50 words or less. In his winning en-

try, Mr. Hallinan wrote: "Most people would laugh at the value of one second. Not me. If I could I would give a spare second to some G.I. or policeman to use in dodging a bullet. Or maybe a fireman, escaping a falling beam."

Ms. Bruno's second prize-winning entry had a lighter touch: "I would set my alarm clock back one second so I wouldn't sleep through it and I could wake up savoring the fact that I finally got something for nothing . . . a gift money can't buy, nobody can steal . . . and I don't even have to share because everybody got one."

The ten prize winners were selected from several hundred respondents. Replies came from more than 30 states. In addition, a number of foreign visitors while traveling in the United States participated in the contest.

RAY BRUSH JOINS LORUS PRODUCTS AS MARKETING MANAGER

Ray Brush has joined Lorus Products in the position of Marketing manager. His appointment was announced recently by Howard Fisher, general manager of marketing. In his new position, Brush will be responsible for marketing, advertising, and promoting the company's all-quartz line of watches and clocks.

Brush previously had been a marketing manager of Docutel/Olivetti, Tarrytown, NY. Prior to joining Docutel/Olivetti, he was an assistant product planner for IBM's System Supplies Division.

Lorus Products is a division of the Hattori Corporation of America, the U.S. subsidiary of Hattori Seiko Co., Ltd., Japan.



Ray Brush
Marketing Manager/Lorus

NEW MRS. AMERICA WINS \$1000 IN HELBROS TIME

Mrs. America made good time in New York City as she received a \$1000 wardrobe of Helbros Worldclass Watches. Mr. Alan

Turin, president of Helbros, presented the variety of styles to pageant winner Donna Russell of Mississippi.



Helbros president Alan Turin presents a \$1000 wardrobe of Helbros Worldclass watches to the new Mrs. America, Donna Russell.

GIA GEM INSTRUMENTS ANNOUNCES NEW QUARTERLY NEWSLETTER

GIA GEM Instruments Corporation has just introduced a quarterly newsletter, *The Scope*. "This newsletter is being produced as a service to our customers" according to Dick Agnew, Manager of GIA GEM Instruments.

The Scope will also contain articles to help readers improve their grading and identification skills, develop new instrument techniques, and keep abreast of recent developments in gemology.

For additional information on this new GIA publication, contact GIA GEM Instruments Corporation, 2912 Colorado Avenue, Santa Monica, California 90406. Telephone toll-free (800) 421-8161; in California (213) 829-5491. Telex: 291651 GEM I UR. Cable Address: Gemin Corp.

NEW VIDEOTAPE ILLUSTRATES PROPER WATCH REPLACEMENT TECHNIQUES

Sales clerks now can replace quartz watch batteries easily and quickly without damaging watches, thanks to the industry's first videotape demonstrating proper watch handling and battery replacement techniques. The 50-minute tape, "Replacing Quartz Watch Batteries," is available from Maxell Corporation of America, which sponsored the tape produced by Zantech, Inc.

"This new tape will save retailers time and money in educating sales personnel on how to properly replace quartz watch batteries," says Ian Irving, national marketing and sales manager for Maxell's Battery Products Division. "With a comprehensive training program on videotape, a store can provide hundreds of employees with low-cost professional instruction."

"Inexperienced clerks are one reason many stores may shy away from offering their customers watch replacement services," notes Irving. "If the store damages a watch when trying to replace a battery, customers can easily become disgruntled and take their business elsewhere," he adds. For some, the risk is simply too great.

Zantech founder and president Louis A. Zanoni, who co-wrote and directed the videotape with his son, Gregory, narrates.

Louis Zanoni, a veteran watch industry consultant and lecturer, is author of "The Quartz Watch Repair Manual" and "The Digital Watch Repair Manual." He was also instrumental in the early development of the LCD digital watch.

During the instructional videotape, Zanoni identifies all major watch case types, demonstrates correct opening and closing techniques, and illustrates the proper handling procedures of case back knives and tools. Zanoni also enumerates common mistakes made by sales clerks when replacing watch batteries and shows how to avoid them.

The "Replacing Quartz Watch Batteries" videotape is available to jewelry outlets, chain stores, department stores, and catalogue showrooms in Beta and VHS formats. Individual tapes are priced at \$95; quantity discounts are available. Quantity users also qualify for abridged samples of the tape. The tape can be ordered directly from **Maxell Corporation of America** by contacting their **Battery Products Division, 60 Oxford Drive, Moonachie, NJ 07074, phone (201) 440-8020; or Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619; (800) 441-7569.**

HEUER'S NEW AIRLINE WATCH

The new Heuer airline watch has the right time at each stopover anywhere in the world. It is a sports version of the Heuer world time watch and is designed for active people whose travels take them across continents and through time zones. This new timepiece is water resistant to 100 meters, and enables the wearer to see simultaneously the time locally in all the 24 time zones of the world. There are two choices of dial: dark grey and brushed champagne.

An extra 24-hour hand on the 24-Hour GMT model is activated by the pushbutton, and can be programmed to local time or a third time zone. On the Airline 12-Hour model, the extra hand takes one turn each 12 hours. There is a reflection-free, scratch-resistant sapphire glass, bi-directional turning bezel, quartz operation and date. The 24 cities on the band are all coded for simple operation in finding the time in other parts of the world.

The 24-Hour GMT model retails for \$790. Reference number for the dark grey dial is



CLASSIC CHARM

This classic and well-appointed Carriage Clock, introduced by Bulova for 1986, is certain to charm any room for years to come. The golden glow of its brass-finished case with lantern handle and felt-tipped feet is picked up in its brushed goldtone dial with spun chapter ring. Black Arabic numerals, minute track, hands and sweep second are strong contrast to the gold. Its scratch-resistant crystal protects it from dust. The model pictured is B2614 ("Dorset"), and retails at \$49.95. Dimensions: 4 3/4"H x 3 3/4"W x 2 1/2"D. Contact: **Clock Division, Bulova Watch Company, Inc., Bulova Park, Flushing, NY 11370.**



Airline Watch from Heuer

895.313; the brushed champagne is number 895.313.

Contact: **Heuer Time & Electronics Corporation, 420 S. Springfield Ave., Springfield, NJ 07081.**

NEW LASSALE MOON PHASE WATCH

Lassale's new moon phase watch is an elegant symbol of beauty. Designed in a smartly-styled, two-tone case and bracelet, this water-resistant quartz watch offers gilt hands and markers set against a midnight blue dial with a date display at 6 o'clock.

The Lassale collection is available at authorized Lassale dealers nationally. For further information, contact **Jean Lassale, Inc., 640 5th Ave., New York, NY 10019.**



Lassale's Moon Phase Watch

WESLEY ADDS COUNTRY CLASSIC CLOCKS

Wesley and Company, a national distributor of batteries and film to the country's largest retailers, has expanded their line to include the production and distribution of Country Classic Clocks. These clocks are an outstanding example of craftsmanship. Housed in a warm wood frame, they bring charm to any room in any home. Wesley offers a variety of styles to choose from, each one with detailed artwork: natural scenery, wildlife, or authentic Norman Rockwell reproductions. All Country Classic Clocks feature the accuracy and dependability of fine quartz timing.

Based in Canton, Illinois, Wesley sells batteries for watches, calculators, and cameras, and have recently become a distributor for Konica film. The Country Classic Clock rounds out the Wesley line.

For more information on Country Classic clocks, contact **Wesley & Company, P.O. Box 370, Canton, IL 61520. Call toll-free 1(800) 447-6438; in Illinois 1(800) 322-2649.**



One of Wesley and Company's Country Classic Clocks.

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For more information contact: **KASSOY, 32 W. 47th St., New York, NY 10036; or call toll free 1(800) I-KASSOY.**



Portable Carat Scale from Kassoy

NEW REY MANUAL THERMINDER OFFERED BY SWEST, INC.

A new manual temperature controller for burnout furnaces is now available from Swest, Inc. The Rey Manual Therminder features solid-state circuitry and provides positive control of manual furnace programming. What makes the therminder unique is its size and price. The Rey Manual Therminder comes in a very compact size, measuring 6-7/8"W x 5 1/4"D x 3 1/2"H. Available in 120V AC or 240V AC, it will sell for under \$200.

This product is one of over 100 new products featured in Swest's just-published 200-page CATALOG 186: Tools, Supplies and Equipment. A \$7.50 value, CATALOG 186 is available at no charge. To receive a copy, contact: **Swest, Inc., Advertising Department, P.O. Box 20938, Dallas, TX 75220; (214) 350-4011.**

FREE REFERENCE GUIDE OFFERED BY OCEANSIDE

Oceanside Time is offering a free reference guide to HT readers. The 37-page booklet is entitled "Quartz Watch Movement Reference and Cross Reference Guide." According to company officials, the booklet lists hundreds of movements and prices. Available free of charge from **Oceanside Time, 2790 Harbor Blvd., Suite 203, Costa Mesa, CA 92627. Toll free number is 1(800) 292-5522 (in California 1(800) 331-5522).**

FREE TOOL CATALOG RELEASED BY FALCON TOOL COMPANY, INC.

The Falcon catalog carries over 30,000 items for mold makers, die makers, engravers and die sinkers. All are illustrated and priced, with industrial discounts up to 35%. The catalog has 36 full pages of Swiss precision and American pattern files, 15 pages of polishing stones, as well as sections on carbide and hss burs and tools; carbide, cobalt, hss cutter and engraving blanks; mounted points and grinding wheels, diamond wheels and abrasives, brushes and diamond files.

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