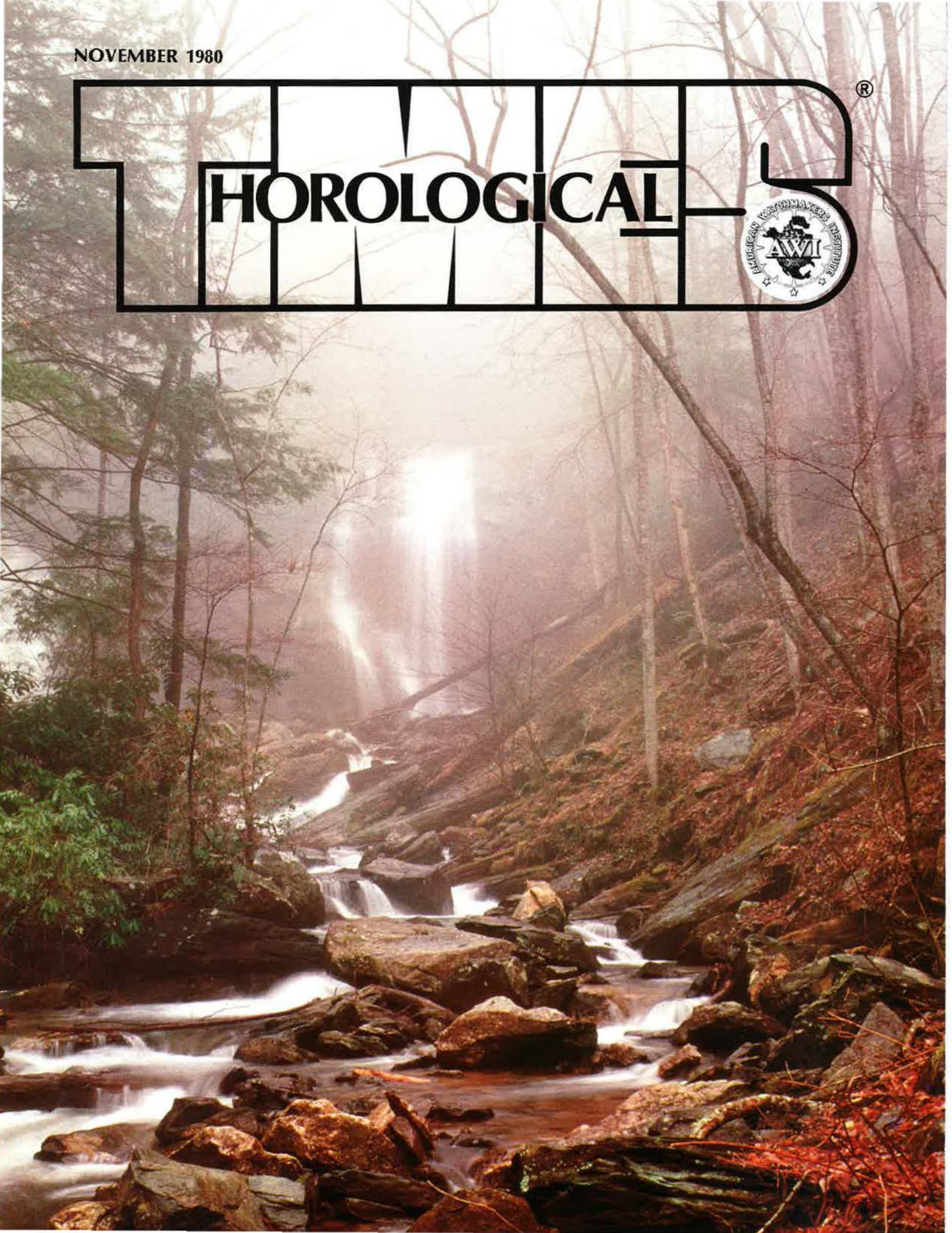


NOVEMBER 1980

TIMES

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JOE CROOKS	4	THE PRESIDENT'S MESSAGE <i>Does Anyone Have the Time?</i>
SEAN C. (PAT) MONK	6	THE ESSENCE OF CLOCK REPAIR <i>The New Haven Bracket Clock with Separate Chime Movement</i>
GEORGE SCHLEHR	8	SCHOLASTICALLY SPEAKING <i>Not by Horology Alone</i>
MARSHALL F. RICHMOND	12	PICKLE BARREL <i>Hazards of the Profession</i>
HENRY B. FRIED	14	QUESTIONS AND ANSWERS <i>Turkish Billodes</i>
JOSEPH RUGOLE	16	WATCH ADJUSTMENTS <i>Hairspring Stud Pinning</i>
FRED S. BURCKHARDT	18	THE ROCK QUARRY <i>Dr. Jekyll & Mr. Burckhardt</i>
COMPREHENSIVE ACCOUNTING CORP.	22	TAX TALK
ORVILLE R. HAGANS	24	IN THE SPOTLIGHT <i>Krazy Clocks: Part IV</i>
ROBERT F. BISHOP	28	AFFILIATE CHAPTER COLUMN <i>Glossary of Problems</i>
ARCHIE B. PERKINS	34	TECHNICALLY WATCHES <i>The Detached Lever Escapement</i>
MARVIN E. WHITNEY	38	THE SHIP'S CHRONOMETER <i>American Chronometer Makers</i>
WARREN E. ROGERS	42	PROFIT THROUGH PROFESSIONALISM <i>Pricing Professional Services</i>
MILTON C. STEVENS	50	AWI NEWS <i>Coleman Memorial Fund Student to Study Clock Restoration in England</i>

BENCH TIPS
makes you
a bet...

26

**Setting
your
"SHOP RATE"**

42

**More
AWI TOUR
Scenes**

44

**First J. E. Coleman
Scholarship
Awarded**

50

DEPARTMENTS

Our Readers Write / 20
Bench Tips / 26
AWI Bench Courses / 27
New Members / 30
Book Review / 36
News in the Trade / 56
New Products and Literature / 59
Classified Ads / 62
Advertiser's Index / 64
Dates to Remember / 64

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In its time, the ESA 9162 Swiss tuning-fork movement was perhaps one of the most accurate and reliable timepieces manufactured. Price tags on these watches were in the upper-middle range, and many customers purchased them as a "lifetime" watch. But this fine watch needs periodic servicing and occasionally fails mechanically or electronically.

The cost of a new module (plate, fork, and electronic assemblies) from one material source could be as much as \$120.00. From another source, a reconditioned movement can be had for around \$50.00, and with a trade-in, for around \$30.00. This trade-in or reconditioned policy is not available from all suppliers. To cite another case in point, from one supplier, a cell coil assembly and component coil assembly costs over \$30.00, while from another, only \$20.00.

Although most commonly used materials are competitively priced, specialized items—such as those just mentioned—warrant some shopping. It is important that the jeweler-watchmaker continue to provide a service to his customers and not price himself out of the market.

On the front

The ANNA RUBY FALLS in Georgia's Chattahoochee National Forest are featured on our November cover. There are actually two falls converging here; in the center of the picture is the fifty-foot York Creek falls, while at the far left, through the trees, can be seen a glimpse of the even higher Curtis Creek falls. The falls are easily viewed from a visitors' observation platform. Chattahoochee National Forest is a beautiful expanse of poplar, pine, and hemlock located in northern Georgia.

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A most desirable feature coupled with quartz accuracy makes this a perfect choice for movement replacement. Two screws enable the movement to be easily fixed to any case. Alarm stopper, alarm hand setting knob, second setter, and battery compartment are conveniently located on the back. Runs over one year on a single AA size battery. Features electronic alarm and step second motion. Comes complete with four hands—hour, minute, second and alarm.



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However, there are instruments which make the quartz timepiece look like an old dollar pocket watch. The hydrogen maser atomic clocks have become the standard timekeepers for most of the world. They are present in many of world's foremost observatories and are the most stable timers ever built; they split seconds into *trillionths*. They are more accurate than the rotation of the earth or its revolution around the sun or time from fixed stars.

Attempts have been made to



Joe Crooks

coordinate the exact time between the nations that use the hydrogen maser atomic clock. However, after several years, some countries were found to be off by as much as 20 millionths of a second. Isn't that terrible! How do you know your country has the correct time?

How accurate are the different time signals that we as watchmakers use for determining the correct time? By these standards, none are. No signal is correct unless it is read from an atomic maser clock. The local telephone time service is handicapped by the fact that an electric signal has to pass through cable. Radio signals aren't truly accurate either, as the time it takes them to pass through the air changes second by second, depending on atmospheric pressure, heat, cold, dryness, precipitation, thunderstorms, sun spots, and numerous other conditions.

Before professional watchmakers go to a meeting or convention, they always set their quartz watches with a time signal. If you want to have some fun, catch three or four together and ask for the correct time; no two will have exactly the same second.

By the way, just who does know what time it is? Mickey here needs a set and wind. TIMES

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The New Haven Bracket Clock With Separate Chime Movement

(Circa 1900)

When one thinks of disconnected chime movements, one envisions the chime movement side by side with the parent unit in the clock. This is not so in our particular timepiece where the chime unit is placed immediately below the parent (time and strike) unit, with the only connector being in the form of a wire trip lever (A of Figure 1) whose function we shall describe.

In article XL of our series we discussed another American clock (Gilbert, ladder chain) which also contained a separate chime movement. The latter, however, was a floor clock, while our particular subject is an English-style bracket clock.

Figure 1 shows the back plate of the clock containing the usual two mainsprings for operating the going (time) and striking trains of an eight-day mechanism. The strike train is of the standard four-trainwheel variety with a fly for controlling the strike speed.

Action of the chiming mechanism is as follows: Attached to the center arbor of the going train and protruding through the back plate is a four-pronged star wheel (B) which raises and releases a hammer release arm (C) every quarter hour. This causes the hammer (D) to kick against a protruding

steel wire (E in Figure 2). This protruding wire is attached to a steel arbor running between the plates near the top of the chime unit, the back plate of which is shown in Figure 2.

The protruding steel wire (E) has three main functions. First, it receives the impulse at each quarter hour from the hammer (D) of the parent (time and strike) unit situated above it. Second, via another steel wire attached to the steel arbor, it locks and unlocks the chime fly in the chime unit. Third, by virtue of a third steel wire attached to the steel arbor, it releases the chime locking plate (F) at each quarter hour. This last operation is accomplished through the flattened end of the third steel wire being lifted free of one of four slots cut into the circumference of the chime locking plate. If one looks closely at Figure 2, it will be observed that this flattened end actually protrudes through a hole (G) in the rear clock plate and normally resides in one of the four slots in the chime locking plate. At each quarter, however, the flattened end of the wire is freed from its slot and rides around the circumference of the chime locking plate until it falls into the next appropriate slot at the end of the particular chime sequence. It should be mentioned that the slots cut into the chime locking plate are staggered in circumference

Figure 1

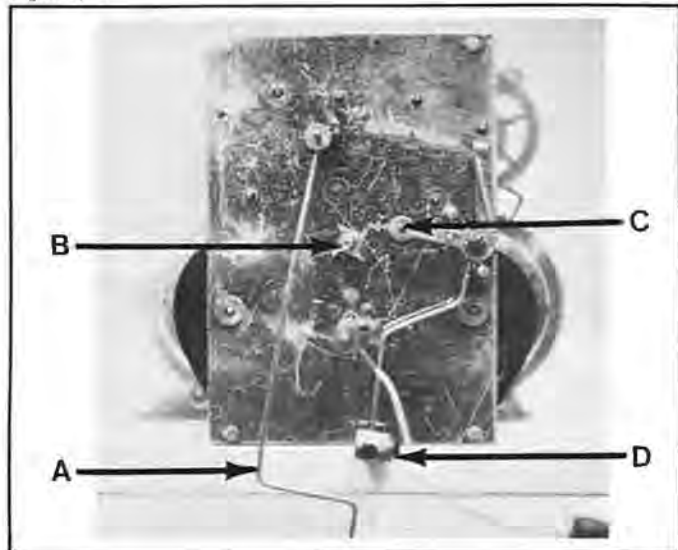
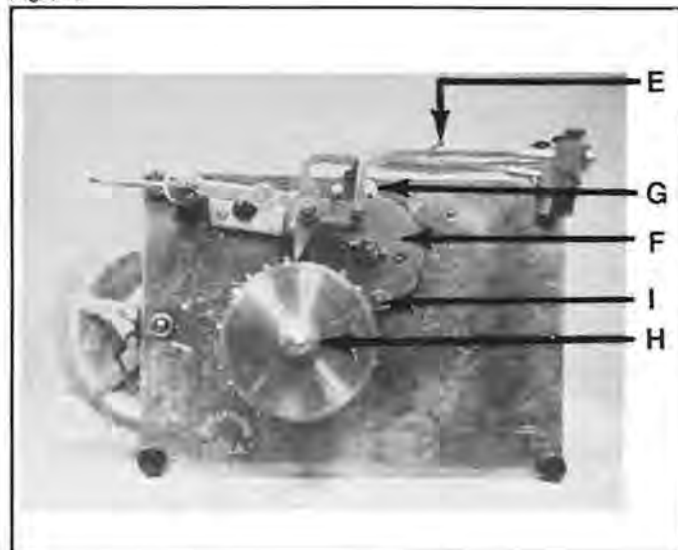


Figure 2



distance, commencing with the shortest distance for the first quarter chime to the longest distance for the full hour chime (Westminster).

The chime barrel (H) is attached to the third chime wheel arbor and is fitted with a series of pins staggered around its contour. The barrel itself is freed and subsequently allowed to rotate at each quarter by virtue of the action previously described, commencing with the freeing of the chime fly to release the chime train. As the chime barrel rotates, it picks up the chime hammers (which can be observed at the top right of Figure 2) to play the appropriate part of the melody by striking on a separately installed steel spiral gong unit.

At the hour position, a brass post (I) attached to the outer face of the chime locking plate lifts the wire trip lever referred to in our opening paragraph as (A) of Figure 1. This trip lever is directly connected to an arbor in the parent unit (Figure 1) which itself has two protruding steel wires. The upper wire serves to lock and unlock the warning wheel in the strike train (as described in previous articles). The lower wire serves to lift a wire located on another arbor above it. This, in turn, unlocks a plate (J in Figure 3) on the arbor of the third strike train wheel. When this plate is freed, the count hook (K) is raised and freed from the count wheel (L) and the strike train is freed. Striking continues, as we have previously described, until the count hook falls into the next long slot in the count wheel. The number of hours struck is dependent upon the number of teeth between the long slots in the count wheel.

The parent unit, Figure 1, contains two mainsprings for operating the going (time) and strike mechanisms, the strike spring being somewhat smaller in both length and diameter than the eight-day going spring. The lower (chime) unit is maintained by a separate spring. A single key is used for winding all three trains.

The two flies (for strike and chime) are unusually made, with their pinions incorporating a soft fibrous material for noise reduction.

A very important safety feature has been built into this clock in the form of the hammer release arm (C in Figure 1). This spring-loaded piece, operating with the unusually contoured four-pronged star wheel (B), allows the clock hands to be moved backwards as well as forwards for time setting without injury to the chime or strike mechanisms. This is an extremely important feature as it is a safeguard rarely seen in striking clocks of any period.

Figure 1 represents the back plate of the upper (parent) going and strike unit. Figure 2 represents the back plate of the lower (chime) unit. Figure 3 is an isometric view of the lower (chime) unit showing some of the special features of the chime train. The photo is taken primarily from the rear. Figure 4 shows the clock reassembled in its bracket clock case. The chime unit is marked "U.S.A. pat. applied for. Wilcox pat. in Canada 1896."

Our special thanks to Stan Warren for his excellent service to this clock and for the preparation necessary for this article.

TIMES

Figure 4

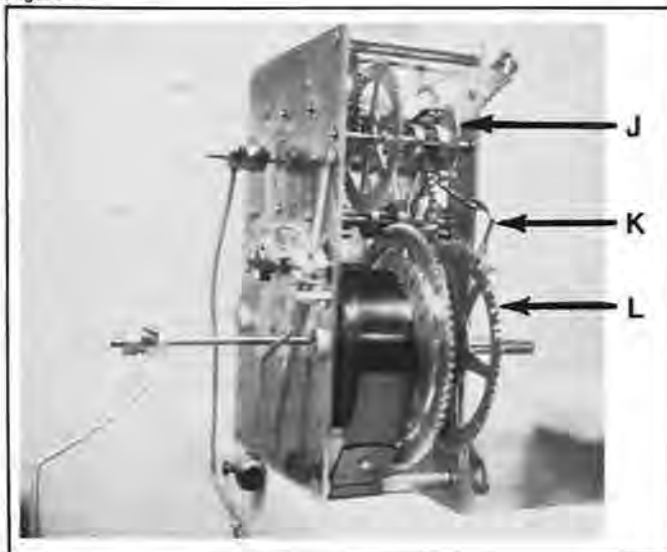


Figure 3



Not By Horology Alone

"Man does not live by bread alone." Neither does the watchmaker or clockmaker living and working in today's sophisticated society survive just by being a first-class bench man. There is something more to success in the business world than cranking out COA jobs that don't come back.

There is a little matter of making oneself clearly understood, for example, in presenting an estimate of repairs to a customer or placing an order over the phone to the counter man at the material house. You can't get the message across if you sound like you have a mouthful of escape wheels. *Communication.*

You've just got to have sufficient command of the mother tongue to explain in great detail the care and feeding of a temperamental 400-day clock to Mrs. J. Q. Public when she drops in to pick up her pride and joy. *Communication.*

Even if you have the somewhat dubious privilege of being chained to the bench and do not have to converse with the public, you must still be able to verbally justify to the boss your earnest desire for a merit raise. After all, eighteen months without a salary increase warrants an opening of the mouth. *Communication.*

Hopefully, the time will come when you are chosen as president of your local guild. You must be able to stand on your two feet, introduce the speaker of the evening in a flattering manner, and exhort the members in a tactful tone of voice to pay their dues. *Communication.*

The paramount importance of communication between humans is certainly recognized in the formation of technical/occupational curricula by state and local education agencies. It is safe to say that the overwhelming majority



George Schlehr

of horology programs sponsored and funded by any governmental direction will have a support course of some kind in communication. Perhaps some of you do not realize that. With a few exceptions, privately owned and operated horology schools do not provide communication training as part of their program.

At our community college, in order to be eligible to earn the certificate of completion of the horology program, the student is required to complete the course entitled Communication 131—Applied Composition and Speech. This course and similar courses taught at other institutions are not "just another English course." To quote from the syllabus objectives: "This course is designed to help the student develop strategies and skills for using both oral and written language adequately in one's

prospective work situation and in one's life outside the classroom. The course should develop the student's general ability to use language effectively in one's everyday life and to train the student in specific forms of oral and written communication which one is most likely to need on the job."

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- 4) Activities in demonstration speech using visual aids.
- 5) Participation in group discussion.
- 6) Written summaries of technical articles from trade magazines. Such assignments are graded for clarity, organization, use of grammar, format, persuasiveness, and neatness. Oral presentations are graded for clarity, organization of ideas, selection of language, use of visual aids, supporting materials, and smoothness of delivery.

We don't expect our students to become G. K. Chestertons or Speakers of the House, but we do believe a little exposure to intelligent communication will make their contributions to society more pleasant and useful to all concerned.

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⌚ Every Minute Counts ⌚

*"You've just got to have
sufficient command of the
mother tongue..."*



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THE PICKLE BARREL

By Marshall F. Richmond, CMW



Hazards of the Profession

Although insurance companies consider people in the watch and jewelry industries to be exceptionally good risks, and the general public hardly view watchmaking as a hazardous profession, this is not completely true. After being in this business for over thirty years and active in local guilds, state organizations, and the AWI, I have talked with many watchmakers and jewelers, and often our conversations have turned to accidents that have taken place—everything from fires, burglaries, and holdups to health problems that have been brought on by everyday work habits or contact with hazardous chemicals.

In watchmaking school, we were told that it would be wise to wear the loupe on one eye in the morning and on the other in the afternoon. This is a good habit that is easy to form when just starting to use the loupe. The reasoning behind this is that continued use of only one eye will strengthen that eye, leaving the other eye weak. As I had been using a loupe for a long time before being informed of this, I was never able to develop this habit, and today it shows up whenever I have an eye examination for glasses. However, the real disability that I suffered is related to but not directly connected with the eyes; in using the right eye exclusively, I developed a tendency to lean to the right during most of the working day. With the onset of age and arthritis came a calcium deposit on my left hip joint which pinched the sciatic nerve. This would disable me for as long as six weeks at a time. After many chiropractic treatments with little or no results, I went to my family doctor who had the hip X-rayed and diagnosed the problem. I was given medication, but told that if I did not get a lot of exercise, I could be an invalid for the rest of my life. In 1971, my business was liquidated and my repair shop was moved into my home where my hours were limited to the equivalent of three days a week working at the bench. Since then, I have gotten plenty of exercise and have not had a recurrence in several years. I hope this serves to illustrate how important it is for good vision and posture habits to be developed while young to save problems in later years.

Another case in point concerns a watchmaker I know who, after many years at the bench, lost the use of his left hand and forearm. After making the rounds of doctors and hospitals, he finally went to the nation's foremost diagnostic clinic. Here he found that his problems were due to his having developed a habit of resting his left elbow on the apron of his bench to steady his left hand which put constant pressure on his "crazy bone." This caused damage to the nerves that controlled the left forearm, hand, and fingers. After treat-

ment, therapy, and adjusting his working posture, he was soon able to carry a normal work load. Again let me point out how important posture is to good health.

In all of our shops we have chemicals that can be dangerous. The fumes from carbon tetrachloride, benzene, acetone, or many of our dip cleaning solutions can be hazardous to our health. Cyanide is a fine jewelry cleaner used by many jewelers, but it can be deadly if improperly used. Even watch cleaning solutions can cause chemical burns to the skin if spilled on clothing and not removed immediately. Acids are found in most shops. Sulphuric acid can be used as a rust remover in watch work and as a pickling solution in jewelry repair. According to a chemist to whom I have spoken, sulphuric acid can also produce the most severe burns to the skin of all acids. Hydrochloric (muriatic) acid with zinc dissolved in it makes a fine flux for soft soldering, and when mixed with nitric acid and water in the correct proportions, produces aqua regia used in testing gold. All acids require caution in handling as they can cause physical injury and much damage to clothing and other surfaces if spilled on them. If water is poured into concentrated acid, the acid will splatter and can get on the skin, in the eyes, or on clothing. Always pour acid into water when diluting to avoid this reaction. If acid is spilled, flush *immediately* with water, as the acids with which we come in contact are water soluble and this will minimize the damage.

Fire is also a hazard in our shops because many of us use highly flammable solutions and gases. When fumes escape from these solutions or gases escape into the air, highly explosive mixtures with air can occur. In jewelry work, we use torches that operate from natural gas, propane, or acetylene usually mixed with oxygen to produce a flame hot enough to flow hard solder or make welds on articles of jewelry. If the hoses or connections leak and let the gas escape into the air, it is not healthy to breathe and is a costly waste. However, it can also create an explosive atmosphere when the mixture is right, and a spark can set off an explosion usually followed by a fire. An explosion of this type can be so powerful that it can level a building and kill or injure any occupants. In one jewelry store that I know of, the watchmaker temporarily stored used watch cleaning solution in a small back room where the gas hot water heater was located. One of the cans started leaking during the night. The solution ran under the water heater and was ignited by the pilot light. The fire was not discovered in its early stages, and many thousands of dollars in damage were done before it could be brought under control and extinguished.

THE PICKLE BARREL

Take the time to learn how to detect a dangerous situation. Natural gas and propane have an artificial additive that produces a foul odor to alert you to escaping gas. Acetylene has a naturally distinctive odor. Whatever you use, learn to detect the odor so you will be alerted to a leak. If you use a torch, turn the gas on and hold the torch a few inches from the nose before lighting it to familiarize yourself with the smell. Whenever you enter a room and smell any of these odors, you should immediately start checking for leaks. Start by checking all torches and burners to see if any are partially turned on and not burning. If this checks out, start checking connections and hoses. If you use regulators with two gauges, leaks can be located by using the gauges. With the torch turned off, open the valve on the tank; one gauge should show the tank pressure and the other the reduced pressure on the other side of the regulator. Turn the tank valve off and if the leak is very great, the tank pressure will drop until it reaches the same as the reduced pressure. Then they will both drop to zero. This is the proof positive of a leak in the gas side of the torch. Turn the regulator knob counterclockwise a couple of turns and again open the tank valve. Only the tank pressure should register, and the reduced pressure gauge should read zero. Turn the tank valve off again, and if the pressure holds, the leak is between the regulator and torch or in the torch itself. If the pressure drops, the leak is between the regulator and the tank—probably in the connection of regulator to tank. This can usually be corrected by tightening the nut. If the leak is between the regulator and torch, again open the tank valve; by turning the regulator control clockwise, set the reduced pressure to the usual setting (usually between three and seven pounds) and try to locate the leak. If no leak is obvious through visual inspection, use a soap suds solution and a brush. Go over the connections and hoses, and any leak—even a very small one—will show a series of small bubbles. Leaks in connections can usually be corrected by tightening the connecting nuts, but leaking hoses should be replaced. A good time to periodically run tests for tight and leak-free connections is when replacing an empty tank with a full one. This may seem like a waste of time, but actually it only adds a few minutes to the time required to change the tank. The feeling of security is worth it.

Many hand and facial cuts or punctures have occurred through the use of watchmaking or jewelry tools. Many

of our tools have to be kept razor sharp to correctly perform their functions. Gravers, either watchmakers' turning gravers or jewelers' engraving gravers, being razor sharp, can inflict painful or even serious injuries. In a watchmakers' school, one student accidentally dropped a graver while doing lathe work. As it passed between his legs he tried to keep it from dropping to the floor by closing his legs together quickly. He did this at just the right time that he suffered a nasty puncture wound in the leg. Recently, many watchmakers have been learning to do jewelry repair and stone setting which require the use of jewelry gravers. Not having the training of a jewelry engraver, it is not uncommon for one to push a graver through the hand when it slips. Occasionally, this happens to the experienced jewelry engraver or repairman. Proper instruction will not eliminate these accidents completely, but will reduce the odds of their happening.

Where torches are used, burns are common. Most are not serious, but any burn is painful, no matter how small. Torches are used to heat metal all the way from soft soldering (low) temperatures to high melting temperatures. Even the low temperatures will burn flesh, as will the flame of the torch if it accidentally contacts the skin. It is easy when your mind is on the work you are performing to accidentally pick up a hot piece, or pass your hand, arm, or fingers over the flame. Careless use of the torch not only can cause serious injury but destructive fires as well. In hard soldering or welding platinum, the heat required is so great that a very bright white light is produced. Your eyes should be shielded with colored glasses to protect from light burn. This is the same eye burn that welders often get from electric arc welding—called a flash. It makes the eyes red and irritated and feels like sand in the eyes. It is not usually serious, but prolonged exposure can be damaging and even cause permanent problems with the eyes.

The polishing motor can be hazardous to use if one gets careless. Most polishing motors rotate at a speed of 3450 revolutions per minute. When holding watch cases or heavy chain against a large buff wheel, they can get caught. The watch case will usually be slung away from the wheel, and it can hit one in the face or other parts of the body, causing cuts or bruises. However, a heavy chain can wrap around the wheel with a person's hand or fingers in it and really mangle the hand or fingers. This can also cause irreparable damage to the article being

polished. When using the polishing motor, it is wise to protect the eyes with protective glasses, as often metal particles are slung from the polishing wheel and not caught by the dust collecting hood. Polishing can produce extreme heat from friction, and an article being polished can get hot enough to cause a burn. Usually the fingers are sensitive enough to heat that there is time to back off before getting burned.

Holdups and burglaries are yet another hazard of our trade. We all handle small articles of high value that can be easily turned into cash. This attracts all types of dishonest people looking for ways to get money without working for it. Some of these people are dangerous and some are not. A real professional burglar is not a dangerous person and does not carry a weapon. He takes pride in his trade and probably works harder for what he nets than he would have to if he turned his talents to honest work. He would rather take a small sentence for burglary than a long one for armed robbery. The problem we face is how to tell a professional burglar from a hoodlum who is dangerous to us physically. Many of the people who would like to relieve us of our inventory or of our customers' valuables are dope addicts and can be killers when under the influence of dope. Several years ago I visited a neighboring watchmakers' guild, and the program for the evening was presented by a police officer who had a great deal of experience in holdups and burglaries. This turned out to be the most informative program that I have ever heard on this subject. Some of the pointers he gave us in case of holdup at gunpoint were to do everything the robber requested, be polite, and all the while observe everything you can about him: height, approximate weight, facial features such as moustache or beard, color hair or degree of baldness, color eyes, color skin, description of clothing, and any noticeable things about his movements or speech. As soon as you can get free to phone, call the police and report the incident. **DO NOT HANG UP THE PHONE UNTIL THE POLICE ARRIVE.** Then hand the phone over to the officer. The reason for this is that the moment a call comes in, the police dispatcher puts you on the air to all patrol cars in your area. Often one of these can spot the robber before he gets far from the holdup scene, but when an officer arrives and leaves his car, he is away from his line of communication. *(Continued on page 49)*



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

Turkish Billodes

Q I am hoping you can help me identify the watch pictured here. It is an 18 size, key wind and key set antique pocket watch with a silver hunting case. The dial (pictured) has unusual numerals (Greek?) and the words:

K. SERKISOFF & Co
Constantinople

Inside, on the movement, the word "Billodes" appears on the mainspring bridge, and a coat of arms appears on the train bridge. Inside the front and back covers are insignia including a grouse, a lion's head, and a lion, side view.

Rolland J. Risch
Atascadero, California

A *Billodes* was a name used by the Zenith Watch Company of Switzerland between 1900 and 1914 to denote watches specially made for the Turkish market.

No doubt K. Serkisoff & Co. of Constantinople was the retail jeweler. All the hallmarks are of Swiss origin, denoting the country of origin and the silver content (grouse = 0.800). The watches were of medium grade, although made by a fine watch factory. Most calibers have stepped or raised train and barrel bridges with the edge of the whole movement a little lower than the inner portion of the bridges. The Zenith Company today is part of the Movado combine.

The dial has Turkish numerals which were outlawed after Atatürk took power in 1926, Westernizing all. At that time, the name of the big, old, charming city was changed from Constantinople to Istanbul.

Q Please furnish me with the following information: the width, thickness, and length of the time spring needed for a Seth Thomas Fashion 2-face calendar clock, patent December 28, 1786.

Thank you.

D. M. Stewart
Little Rock, Arkansas



A I believe that you will find the patent date which you mention of December 28, 1786 to be a little early, since mass-produced brass clocks were not made in America until around 1838.

However, the time spring that I use on Seth Thomas Fashion calendar clocks is one or the other of the following:

11/16 in. x .018 in. x 96 in.

or

3/4 in. x .018 in. x 96 in.

Measuring the length of the winding arbor will indicate which to choose in order to avoid a rubbing action against either the plate or wheel.

These two springs are the common power plants of most American 8-day pendulum clocks, and although they are a little stronger than needed in some cases, I feel the extra strength is necessary here where the time train must trip both the striking and calendar mechanisms.

James Tigner

Q Recently, I had the pleasure (doubtful at first), of working on a rather old watch that I hope you can give me some information on.

This watch was cased in a heavy,

18K yellow, nicely engraved hunter case. It was key wound and key set, and approximately 20½ ligne. (The dial measured 46 mm.) Engraved on the movement and in the case was the number 20830. The name on the dial and engraved on the movement was ULYSSE A. BOURQUIN BIENNE. The barrel was engraved "Main Power Wheel Improved."

The movement was in very good condition. I do not remember if it were 15 or 17 jewels. I would like to know the age, if possible, or anything of interest about this watch.

I also have a question concerning the "stop work" of this watch. How much power should be applied to the mainspring before engaging the "stop work?" Is there a general rule concerning this?

I have enjoyed your many good items in the *Horological Times*, and hope you can answer my questions.

Harry R. Shirey
Smyrna, Delaware

A Since I see many, many different types of watches and have an intense interest in them, I remember the watch of which you speak. These are, of course, Swiss made. They resemble the early Howard watch movement very, very closely; sometimes they also resemble the product of the Philadelphia Watch Company, and I feel strongly that that company had their movements made for them by the Bourquin people in Switzerland. The Bourquin movement had a type of barrel resembling the Reed's patent barrel used by Howard with maintaining work (during winding). Ulysses A. Bourquin operated out of LeLocle and had London offices from about 1880 to 1900. Your watch is closer to the 1885 period.

As for the stop works, first wind the mainspring fully, starting from complete let-down. As you wind, try to keep count of how many full turns are required of the barrel arbor or key that is doing the winding. Say, for example, that seven full turns are required. It is

(Continued on page 46)

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HAIRSPRING STUD PINNING

The last operation in making an overcoil hairspring is attaching the spring to the stud. It is supposed to be a simple operation, but many inexperienced watchmakers make it more complex than it should be. Two aspects of this operation are important: namely, the theoretical and the technical. The only important theoretical aspect is the observance of the length of the overcoil. This one point is often misunderstood. To clarify it, I wish to remind the readers of the conditions required if an overcoil is to be isochronous. The third condition states that the center of gravity "G" must be at a distance from the center of rotation which is equal to the square of the radius of the spring divided by the length of the overcoil. ($OG = \frac{R^2}{L}$) See Figure 1.

Although the length of the overcoil can be changed drastically if the form of the overcoil is not being followed correctly, the final and the most drastic departure can be made when pinning at the stud. During the overcoiling procedure, we used three reference points on the overcoil, namely points A, B, and C. At this time, the starting point is used to determine the pinning point because the length of the overcoil in degrees must correspond with that which is found on the diagram which was copied. Beginners often make the mistake of insisting that the vibrating point, which was determined by careful counting of the balance and hairspring, must be placed between the regulator pins. Often when the work is performed properly, the vibrating point does fall on point "C." However, if we have made a number of minor mistakes during overcoiling, the true vibrating point either will not reach point "C" or will pass beyond it. Large errors in execution of the overcoil should not be tolerated and the corrections should be made before fitting the spring to the stud. Minor errors, however, may not be readily determined, and the accumulation of several small discrepancies could develop into a situation where the vibrating point will not be located at point "C" on the diagram after the completion of the overcoil. Here we have a choice of either attempting to find and correct all the small errors, or moving the vibrating point to the new location. The main and most

important consideration is that the length of the overcoil between points "A" and "C" must be exactly the number of degrees calculated for that particular shape. Some curves are made with the length of 180° . Several models of Elgin watches use such curves. Bossard and Grenda curves are made to be 240° long regardless of the shape, but Helwig curves vary in length with the shape. They can be anywhere between 180° and 315° long. Thus, when fitting the spring to the stud, we no longer insist on placing the vibrating point between the regulator pins, but must observe the length of the overcoil from point of departure to the regulator pins. If the spring

when so pinned does not vibrate the required number of beats per hour, then we change the mass of the balance to bring the watch to time.

Practical pinning to the stud is made easy with the studding tool, but not very many watchmakers use it. The alternative method is to use the balance cock. The stud is fitted to the cock and the screw tightened. The end of the spring is fitted into the hole to the exact pinning location previously determined, and the pin is fitted into the hole. The pin must be of such a diameter that it will fit approximately half way into the hole before force has to be applied to drive it home. To push the pin tight, watchmakers

use various methods. Any method is satisfactory if the spring is fitted tight enough to hole the spring and no damage is done either to the spring or the stud. Some studs are made of brass or other nonferrous metals, and if too much force is applied, the stud will split at the hole. An old pair of tweezers specially prepared for the job seems to work best. The pin and the spring must be cut off at the back near the stud with a pair of fine cutting tweezers, No. 15 A. There must be no possibility of interference with the knee bend of the overcoil. The large end of the pin should also be cut off near the stud. Special care must be exercised to prevent accidental cutting of the spring. Another method would be to pre-fit the pin as in pinning at the collet.

When the pin is fitted as described, the spring can be centered and leveled while on the balance cock. It is easier

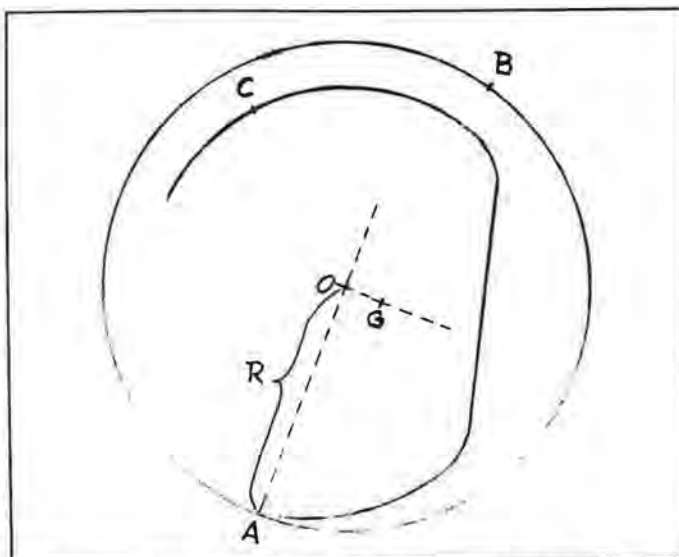


Figure 1. When fitting the spring to the stud, the length of the overcoil is important.

to make minor adjustments during this operation before the spring is applied to the balance wheel.

The next two operations are testing for concentric development and testing for isochronous performance. Concentric development will be achieved if and when conditions for isochronous performance are met. It is more likely than not that the hairspring will not be developing concentrically on the first try. Careful observations will likely show that one side of the hairspring expands and contracts more than the side opposite it. If such is the case, it is almost impossible to find where the error was made. It is possible, however, to correct the performance of the hairspring by applying a simple rule for a rather difficult adjustment. The procedure is as follows: With the watch in front of you, rotate the movement until the side of the greatest expansion of the spring is away from you. When in this position, manipulate the terminal curve of a left-handed spring to the right, and of a right-handed spring to the left. See illustration in Figure 2. This may slightly change the isochronal performance of the hairspring, but the main point is that the spring will not be isochronous until it also develops concentrically. When we are satisfied with concentric development of the spring, we proceed to test it for isochronism. This test is normally done at three different amplitudes. By definition, an oscillator is isochronous if short and long amplitudes are completed in equal time intervals. To test a balance for isochronism, we should attempt to make all other possible errors constant. For this reason, watches are tested in dial positions only, i.e., either dial up or dial down, because there is no gravity effect present and the friction is at a minimum. The watch is fully wound, and then the power is released 3 to 4 turns to get an equivalent of 24 hours of running. (The number of turns will depend on the ratio between the number of teeth on the barrel and the number of leaves in the center pinion.) A record

is taken on the timing machine. The watch is now wound to about 12 hours of running, and another record is taken. The same is repeated with the watch fully wound up, and the three records are compared. If there is a substantial difference between them, the watch is not isochronous and should be adjusted. The differences tolerated will vary with the quality of the watch, but anything greater than 10 sec/24 hr. should be corrected. High quality watches are usually adjusted to less than ± 2 sec./24 hr. between the high and the low amplitudes.

It is better if the short amplitudes are faster. Such a condition would help equalize the differences between dial and pendant positions, since the latter normally produce a losing rate due to greater friction. If the short amplitudes are slower than the long, it will be much more difficult to equalize horizontal and vertical positions.

There are two rules for correcting an overcoil for isochronism. The one which is universally known to watchmakers is as follows: "To speed up short arcs, manipulate the overcoil closer to the balance staff and vice versa." This rule is valid for the majority of situations, but every once in a while it works in reverse. It took a while before the mystery was solved. The corrected rule acknowledges the importance of the pinning point at the collet. It states: "To speed up short amplitudes, turn the point of attachment toward you, and then true the overcoil of a right-handed spring to the right, and of a left-handed spring to the left." See Figures 3 and 4. In most situations, this will mean moving the overcoil toward the staff as in the basic version of the rule, but occasionally one finds the situation as in Figure 5 where it is necessary to move the overcoil away from the staff in order to speed up short amplitudes. To illustrate the exact manipulations is always a little difficult, and it is necessary to point out one important observation: Whenever the shape of the overcoil

Figure 2. Direction of manipulation of the overcoil to achieve uniform expansion and contraction.

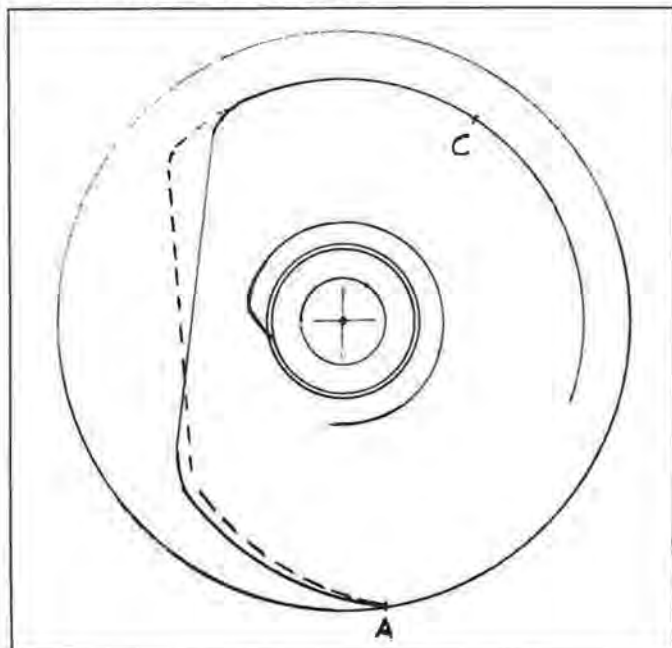
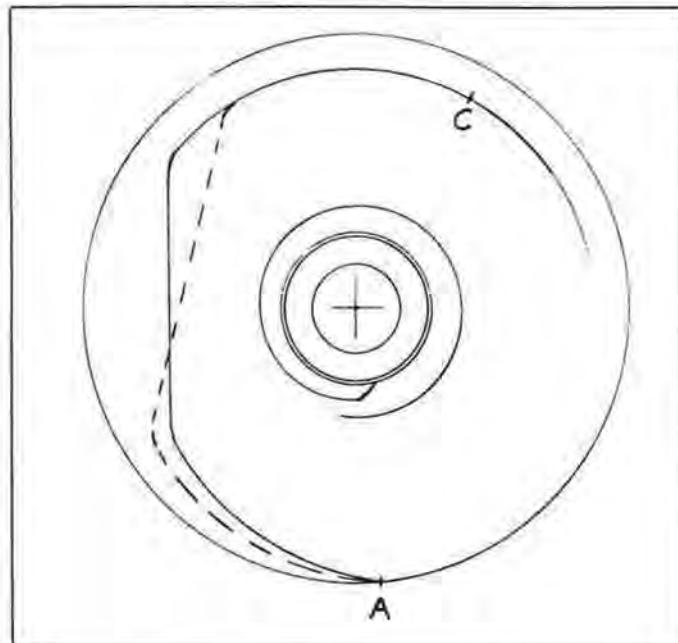


Figure 3. Direction of manipulation to speed up short arcs of a right-handed spring.



THE ROCK QUARRY

By Fred S. Burckhardt



Dr. Jekyll and Mr. Burckhardt

She was a sweet little old lady: grey hair with just a tinge of blue, high-heeled shoes with white anklets, and wearing about four pounds of nice jewelry. As she approached the repair counter she asked, "Do you repair watches?"

"Yes," I answered. "What seems to be the trouble?"

"I don't know what happened but my watch just stopped running," she said.

After rummaging through her purse for several minutes, she came up with about a half box of tissues in which her watch was wrapped.

"My husband, bless his soul, gave this to me thirty years ago and I've never had to have it repaired."

She carefully unwrapped the tissue and handed me the watch. It looked like an eighteen-wheeler had run over it and then backed up to make sure.

"Did you have an accident?" I asked.

"I don't know what happened," she replied. "I only wear it to church on Sundays. I just looked down and it wasn't running. Will it cost much to have it repaired?"

"Well, let me look at it and see," I answered.

The crystal, hands, stem, and crown were gone. The balance staff and escape wheel were broken and the dial was messed up. I took it back and told her how much the repair would cost.

She said, "My husband gave this watch to me and now he's gone, bless his soul."

I said, "I know. You told me that before."

She then said, "You know, it's hard to live on a small pension. I don't know if I can afford to spend that much money. Maybe if I went without lunch for a few weeks . . ." Her eyes grew moist.

Being the softie that I am, I said, "I'll tell you what. I'll only charge you for the parts and not the labor. How would that be?"

She didn't give an answer, only asked for a glass of water so she could take her heart pills. She then said, "My, this medicine is so expensive. I guess I could cut down on it so I would have enough money to pay you for fixing my watch."

I felt another tug at the old heartstrings and thought to myself, "Would you want somebody to treat your grandmother like this?" I said to her, "I'll only charge you what the parts cost me—no profit. Surely that should be fair enough with you. You know, I have to pay bills, too," I added.

Just then another customer walked in, said hello to me, and stopped for a minute to talk to the old woman. She then went over to the other side of the store, still within hearing range, and browsed around the show cases. In the meantime, the old girl and I continued our conversation. Finally she said, "Well, I have to go now. It's my day to visit friends at the old folks' home. I guess it won't be much longer before I'll be there with them."

That did it. "Leave your watch with me and I'll repair it free of charge," I said.

A smile came across her sweet face. She said, "You're so nice. I really appreciate your thoughtfulness. I know my husband, bless his soul, appreciates it, too."

She got up and started to leave and said, "Will you fix the dial, too?"

"Yes," I answered. "It will look like new when you get it back."

After she left, I went over to the other woman. She said, "I didn't know she was one of your customers."

I said, "No, not really. This is the first time she has been in."

"Then you don't know who she is?" she asked.

"No, I just figured she was someone from the retirement village by the lake," I answered.

She laughed and said, "She is one of the wealthiest women in town. Her husband was in the oil business and when he died he left her with a bundle. She has more oil wells than you do rings in the showcase."

I said, "Surely you're kidding!"

"No," she answered. "Do you know that big home that sits on the hill on the way into town?"

"Yes," I answered. "Is that where she lives?"

"No, that's her servants quarters. She lives in the main house that sits further back off the road. You can't see it from the highway. She is considered to be a little eccentric. She'll squeeze a penny 'til Lincoln gets tears in his eyes and then turn around and donate a million dollars to the 'Save the Aardvark Fund.' Don't tell me she got to you?"

"That's what I get for being Mr. Nice Guy," I said. "From now on, I don't care if they have to pay with food stamps—they're going to pay!"

In a little while, another elderly woman came in and said her watch needed to be repaired. I remembered my oath and quoted a price—adding a little extra to make up for the other job. I said, "That's the price. Take it or leave it. If you want me to fix your watch, that's how much you're going to pay—in advance."

"That's a little steep, isn't it?" she asked.

I said, "Look, I'm sick and tired of hearing you old people always crying about not having any money. If you want your watch fixed, pay me. If not, flake off."

I could see the tears forming in her eyes and her lip started to

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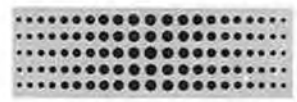
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Count on Maxell batteries being easily available from your local watch material distributors. After all, what good is a tool if you can't put your hands on it. Rely on Maxell for quality. Many of the world's leading quality watch manufacturers include Maxell batteries as original equipment. And they recom-

mend us as replacements. Our batteries work for them. They can be your tools as well. Contact Maxell for the details.


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Our Readers Write

A G.I. Reply

I read the article, "Why AWI Is Not G.I." written by AWI President Joe Crooks in the September issue of *Horological Times*. I am one of those retired G.I.'s who called the Institute regarding AWI and G.I. benefits. You told the story like it is. (I am enrolled in the clock repair course.)

I would appreciate your permission to send a reproduced copy of your article to the Air Force Sergeant's Association.

Thank you.

A Proud Member of AWI,
Sherman W. Shrader
Montgomery, Alabama

Editor's Note—Your comments and understanding of the situation in which we found ourselves with the VA are appreciated.

preciated. I know Mr. Crooks agrees with me in telling you to feel free to use the article in any way you see fit. We can only hope that it might encourage someone at the VA to re-evaluate the tangle of red tape which ensnared us in our attempt to be of service to our members.

INVESTMENT DIVIDEND

When I received an answer to my request for information on repairs to a model 115 AB Seth Thomas Ships' Bell Clock, it included a note that the information was taken from J. E. Coleman's book. I promptly sent in my order for the book which I just received. It was paid for by that repair job.

M. Odlivak
Monsey, New York

CLASSIFIED RESPONSE

Thank you for placing my classified ad in your publication. The response to my request for a second-hand lathe was very good; also, I met a very good watchmaker living within 25 miles of my home whom I already feel is a good friend. I purchased his extra lathe.

Thank you

Ernest Schettler
Georgetown, Delaware

SOLD! BY OUR COVERS & CONOVER

Enclosed is my check for membership in the AWI. The beautiful covers and articles by Steven Conover are worth the \$30.00. That makes articles by such authorities as Fried, Hagans, Benesh, Monk, *et al*, a wonderful bonus.

Hal Standley
Pensacola, Florida



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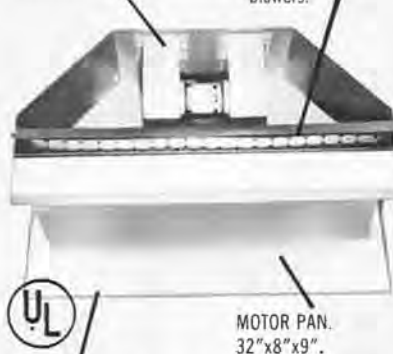
8" HOOD CLEARANCE. Permits use of buffs to 6" diameter.

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Cleaner air... better recovery of precious metals... they are more important than ever for today's shop. The smart thing to do now is to look into all the deluxe PRO-CRAFT polisher/dust collector has to offer. It was designed for the widely varied needs of light jewelry manufacturing firms and repair shops. It has the powerful suction needed to keep your shop dust-free... protecting an operator's throat and lungs while reducing expensive waste of precious metals. Another big plus for this deluxe unit is its convenient and simple operation.

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See your jewelers' supply house for information on the complete PRO-CRAFT line, or write us for bulletin 50-160.



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TAX

QUESTIONS AND ANSWERS BY COMPREHENSIVE ACCOUNTING CORP.

Comprehensive Accounting Corporation of Aurora, Illinois, provides a monthly bookkeeping, accounting and tax service to over 19,000 business clients through its nationwide network of franchised accountants.

QUESTION: Did you know that you may save substantial taxes by incorporating your business?

ANSWER: If you operate a profitable proprietorship or partnership, you may save a substantial amount of income taxes by incorporating. In addition to the non-tax related benefits available through incorporating, the advantages of having a corporation for tax purposes should also be considered.

The corporations pay tax at the rate of 17% on the first \$25,000 of taxable income, 20% on the next \$25,000, 30% on the next \$25,000, 40% on the next \$25,000, and 46% on taxable income in excess of \$100,000. These rates should be compared to the income tax brackets for individuals. An individual with earned taxable income of \$50,000 or more is taxed at the 50% bracket as distinguished from a corporation which only pays 20% tax up to \$50,000 of taxable income and 30% on taxable income between \$50,000 and \$75,000. Businesses that require the reinvestment of profits for capital needs may be paying more taxes at the individual level than at the corporate level, making a capital expansion more difficult.

The corporation during its first year of operation is permitted to adopt a fiscal year end at the end of any month. Thus the corporation can select a year end which is different from the individual owner's year end which may allow you to shift

TALK

income from one individual tax year to another. For instance, if a cash basis corporation had its year end on January 31, it may pay bonuses to officers in December, or shift the bonus to the following year by paying it in January. The officers will report the income in the year received, but the corporation is allowed the deduction as of its fiscal year end of January 31, regardless of whether the payment was in December of January.

Many tax benefits accrue to the owners of the corporations who are also employed by the corporation. The corporation can adopt a group term life insurance plan and provide \$50,000 worth of life insurance to its employees as a fringe benefit without the employee paying income tax on the premiums paid for the life insurance. Further, the corporation can establish other fringe benefit programs which will allow you and the other employees to enjoy increased tax-deductible benefits including qualified retirement plans such as a pension or profit sharing plan. The amount which can be contributed to these plans each year can be substantially more than the amounts allowed under a self-employed retirement plan which will be limited to not more than \$7,500.

The corporation may also elect to be taxed as a Sub Chapter "S" corporation which will allow you to include the corporation's income or deduct its losses on your personal income tax return. The selection is beneficial where the corporation anticipates losses in early years of startup.

The above are only some of the tax benefits relating to incorporating your business, however. You should contact your accountant or attorney if you are considering this move.

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Part IV

This series of nonconventional Krazy Clocks accumulated over the years is presented to break the somber trend of serious and commercial motivation:

Smile a while—It's worth while

If you have a Krazy Clock, send photo and information to O. R. Hagans, 6930 E. Girard Ave., Denver, CO 80224.

Clock Works Fitted To Tree Trunk

No matter what the article, Carl Meding, watchmaker, would convert it into a clock or watch without blinking an eye. A hornet's nest, a straw hat, or even Al Smith's derby—it didn't matter, for Meding would make a clock out of anything.

The masterpiece of strange timepieces, he claimed, was the big five-foot clock shown here which he made from a tree stump.

Straw hats, whisky barrels, tree trunks, and a mounted bat were just a few of the articles this German-born workman transformed into clocks of ingenious design. His shop window was crowded with strange looking objects that on close inspection, turned out to be timepieces.

His strangest creation was a tiny watch set in the body of a mounted bat—the bat having been brought to him by a woman who was skeptical of his boast that he could make a clock out of anything.

Old Wagon Wheel Clock

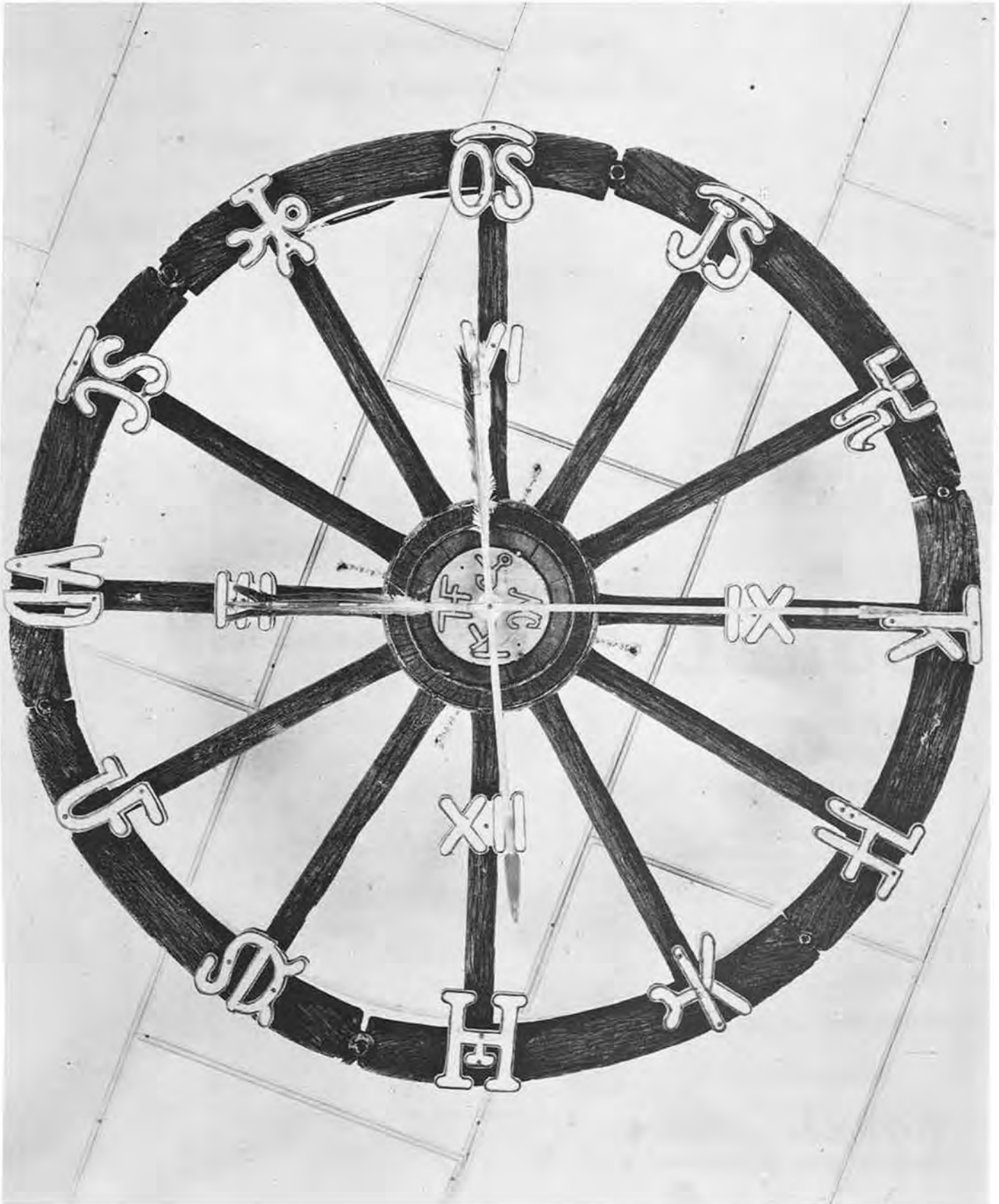
Studebaker Stage Coach wagon wheels had 12 spokes and are hard to find these days. This clock was mounted in the ceiling of a summer home. The numerals are famous old western ranch brands; the movement was made by hand and mounted in the hub, powered by an electric motor. The hands are old Indian arrows.

The clock is also a light fixture with three specially made neon tubes mounted on the upper rim. They are not visible. The tubes are three different colors: green, red, and white, thus affording any color effect desired by a simple snap of the switches.

TIME



Carl Meding and his Tree Trunk Clock





Use Same Torch In All Jewelry Repair Jobs

This is the second tip we have printed from Mr. J.B. Gregory, 108 N. Main Street, Newton, North Carolina 28658.

I know your bench tip articles are about watch and clock repair, but many watchmakers also do jewelry repairing and soldering with a torch. Since most of their gold soldering is ring sizing, it is often impractical to invest in the small type of torch that can be used to solder the serpentine and extra-fine chains which are now so popular. However, one of the tips on the large torch can be modified to do all types of soldering.

I turned down the end of my No. 7 torch tip in a lathe in order to friction fit different sized hypo needles onto it. With this, I can solder the smallest chains made and retip the thinnest ring prongs without melting them down where



not wanted. The pictures show how to turn down the tip. It can still be used for heavy soldering jobs.

You must use less pressure on the gas and oxygen gauges for each size

smaller hypo tip used, in order to keep the flame from blowing out when it is adjusted to the highest heat.

Thanks, J. B., for the "tip" about a tip.
(Continued on page 46)

ERNEST **BOREL** **cocktail** DISC REMOVAL TOOL

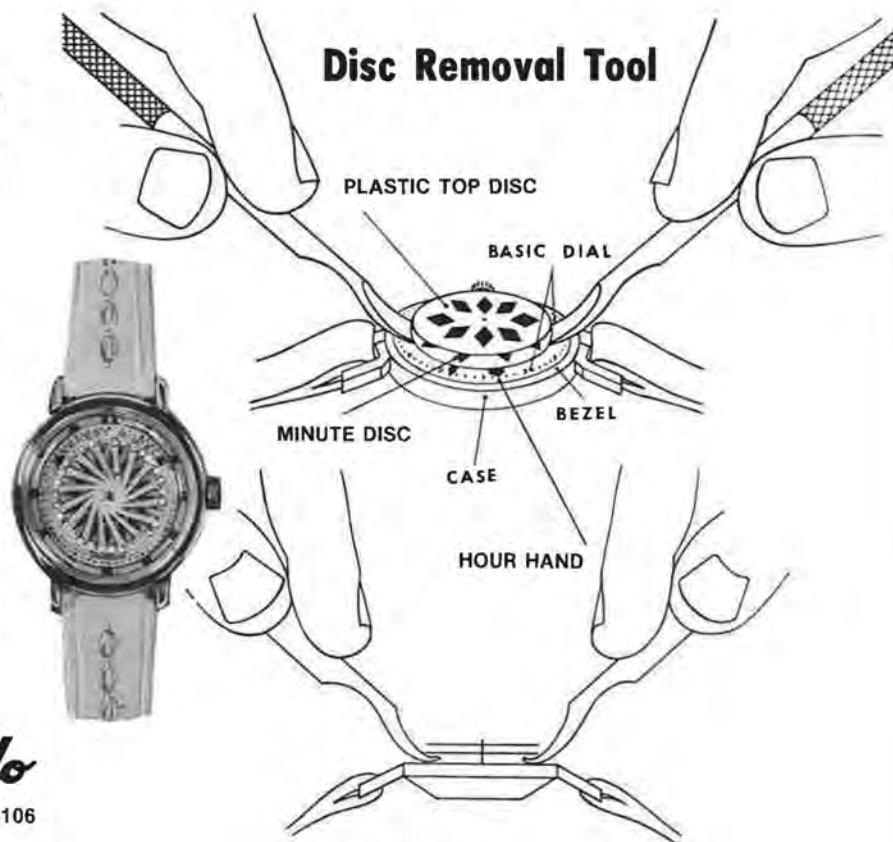
Borel has available a set of tools for easy removal and adjustment of the discs on Cocktail Watches, complete with instructions.

Replacement discs are available for ladies' and men's Cocktails.

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Programs	Instructors
A Basic Electricity & Use of Meters	Jeager
B Citizen LCD Alarm	Carpenter
C (a) Citizen LCD Multi-Alarm	Broughton
C (b) ESA/ETA Quartz Analog	Broughton
D (a) Seiko 4300 Ladies' Quartz Analog	Smith
D (b) Seiko LCD Chronograph/Alarm	Smith
D (c) Seiko 0903A Men's Quartz Analog	Smith
E Intro. to Solid State Watch Repair	Nelson
F (a) Bulova Quartz Analog (SMQ)	Opp
F (b) ESA LCD Chronograph	Opp
G ESA Digital/Analog	Biederman
H Clock Restoration	Benesh

NOVEMBER, 1980

1 & 2	H	Providence, RI	Benesh
2	C (b)	Atlanta, GA	Broughton
2	F (a & b)	Cleveland, OH	Opp

JANUARY, 1981

11	F	Houston, TX	Opp
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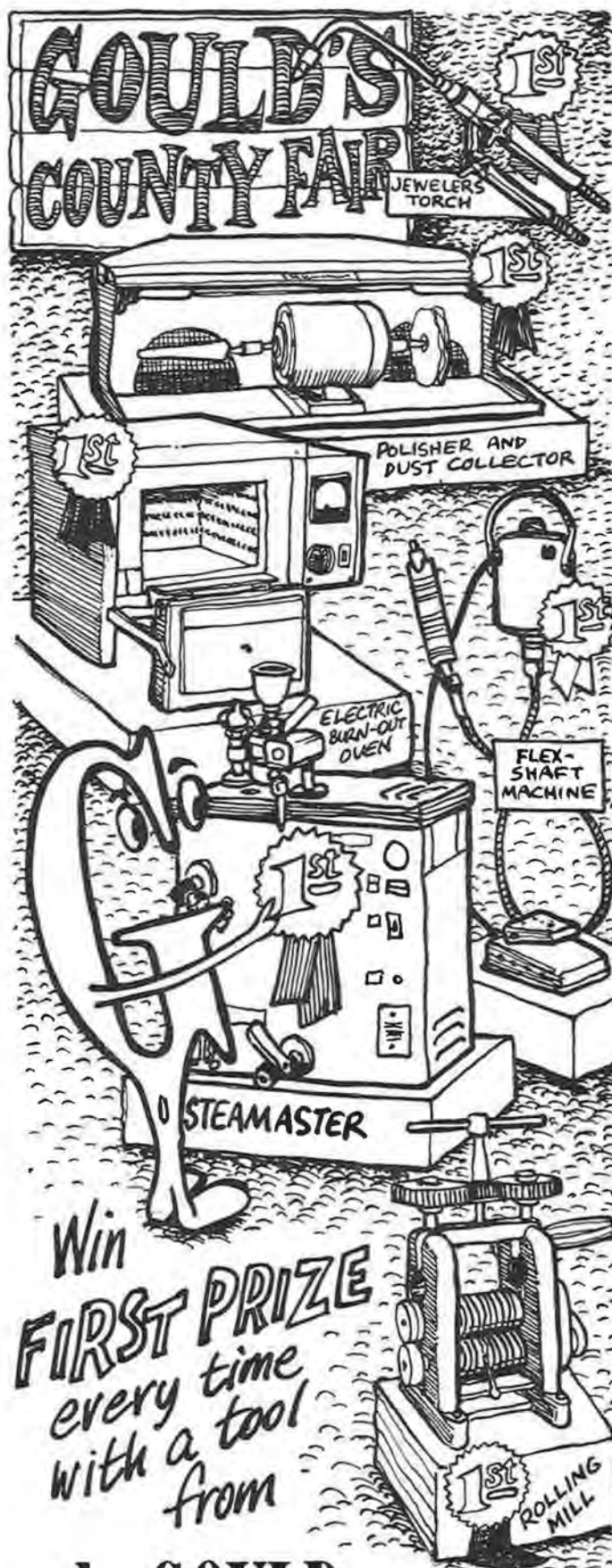
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Glossary of Problems

This month we will continue with our glossary of the problems faced by the average Affiliate Chapter. Last month, under A, we found Apathy. Now that you have "solved" that problem, let us move on to the next letter:

Boredom The state of being bored, wearied by ennui or tedium.

We have all faced boredom at our association meetings at one time or another. The wise officer tries to keep the boring parts to a minimum. Meetings should start on time. True—some members may be more interested in conversation, but many will become bored waiting for the meeting to start. The necessary parts of the business meeting, such as the minutes, treasurer's report, etc., should be brief and ready to be presented at meeting time. Make sure, however, that in the attempt to be brief, members who wish to speak to the subject are not ignored.

Your program chairman should be aware of the interests of the members. Although any program may bore a few individuals, the good chairman chooses programs of interest to the majority. However, the most interesting program can be boring to the members in the rear who cannot see or hear it. If you have difficulty in following the program, don't be polite and silent. Make the speaker aware of the problem.

Encouraging member participation is another way to prevent boredom, but do not allow debate to become repetitious. This can be as boring as silence. Short breaks are helpful during long meetings, and don't neglect intelligent humor to relieve the tedium at times.

Budget A plan for the coordination of resources and expenditures.

Organizations, like families, at times try to live beyond their means. It is vitally important that your association share its financial records with you, the member. If at any time you feel that the programs and activities are not



Robert F. Bishop

properly funded, it is your duty to speak out. Insist that your chapter make a budget and live within its income.

Communication 1. An exchange of information; 2. Information communicated; 3. A technique for expressing ideas effectively in speech or writing.

*"...the conscientious
chapter needs feedback
from the guilds
and members."*

The lack of communication is evident too many times in our "average" chapter. So often, the left hand knows not what the right hand is doing. You, the member, probably have wondered why I haven't directed these thoughts about the average chapter directly to your leaders. Communication—or the lack thereof—is the reason. Hopefully, this shotgun approach will reach those people effectively. Also, you—the lay member—may be a leader yourself someday.

Communication within an organization is difficult to achieve. It requires time, effort, and money on the part of both the leaders and the members. Because of the few scheduled meetings and the distances involved, most chapter must rely on the telephone and the letter for communication. The telephone is expensive, and letters take much of the leaders' time, but the successful chapter must be willing to spend the money and the time. One suggestion is to use the telephone after 11 p.m. or on weekends, to take advantage of the reduced rates. If the calls are brief and businesslike, the cost will be little more than postage.

AWI has a policy of making one key person in each affiliate chapter its contact for AWI communication. Sadly, in some chapters, that key person does not relay the AWI message to the proper people. Three delegates at the recent Affiliate Chapter Meeting submitted their chapter reports on their association letterhead. They had not received word or known about the new report form. Somewhere along the line, communication had failed.

Communication is a two-way street. Not only must the organization keep its guilds and members informed, but the conscientious chapter needs feedback from the guilds and members. If you see a problem developing, don't assume that others will step forward. Speak your mind—communicate. Don't let "George" do it. He has enough to do already.

THE



...from all around the ASSOCIATION...

MASSACHUSETTS

The September meeting of the Massachusetts Watchmakers Association was held in Cambridge, Massachusetts.

The program concentrated on crimes against the jewelry industry which have increased tremendously. In its concern about the rising levels of crime faced by jewelers, Jewelers Mutual Insurance has unveiled a major film, "This is a Hold-Up."

This twenty-minute color film looks at three actual cases from the files of Jewelers Mutual. Don Gallaway narrates the cases, and as each one is concluded, the viewer is taken back to the crime and shown how it could have been prevented.

Also presented was a film about employee dishonesty entitled "The Ten Billion Dollar Rip-Off." It is estimated by the U.S. Commerce Department that more than \$20 billion was stolen from American business last year by dishonest employees.

The producers of this film have spent hours talking with individuals convicted of these crimes, and a 15-minute condensed conversation has been put on tape which deals with topics not covered by the film.

ARIZONA

The Central Arizona Horological Guild held its first meeting of the year on September 16, 1980. This dinner meeting featured a husband and wife team speaking on "How to Sell Yourself to the Public and Your Employer."

NEW YORK

September's meeting of The Horological Society of New York featured guest speakers Tom Broderick and Charles Steeber. Mr. Broderick is vice-president in charge of consumer products for Varta in the United States and Canada.

Mr. Steeber is an engineer and is in charge of all nickel cadmium products for Varta in the United States and Canada. Mr. Broderick introduced Varta Products to the members, and Mr. Steeber presented technical data and answered questions from the audience. A cross-reference guide and other important descriptive materials were presented to members and guests.

NORTH CAROLINA

The Piedmont Crescent Guild held its August meeting in Salisbury, North Carolina. The meeting consisted of two parts: slides provided by AWI on gear cutting and presented by AWI President Joe Crooks, and a demonstration of the L & R Aqua Torch.

CONNECTICUT

The Board of Directors meeting held September 7, 1980 completed the necessary business outlining the future direction of the Connecticut Watchmakers Association. The Board elected S. Chop, D. Meunier, and W. Kavanagh to the nominating committee. This committee suggested that the present slate of officers and directors be recommended to continue in effect for 1981.

The Bulova Watch Company's Quartz Certification Program Seminar was held September 17, 1980 at Rocky Hill, Connecticut. Of the thirty participants, more than one-third were members of CWA. The seminar was a successful benchwork program that emphasized diagnosis, trouble shooting, and servicing Bulova Quartz watches. Many elements of these techniques can be applied to other quartz watches also. Credit must be given to Henry Frystak of the Bulova Field Training Service Staff, who patiently and thoroughly explained the operation of each movement and assisted individuals at the

bench operations. CWA member Don DeWolfe (of Portescap) presented an exhibit of timing and cleaning machines and assisted Mr. Frystak when needed. The Board of Directors wishes to thank the Bulova Watch Company and Mr. Henry Frystak for making this instructive seminar available.

INDIANA

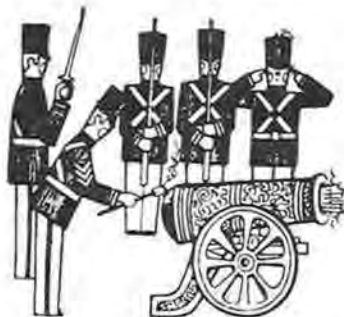
The Watchmakers Association of Indiana held its annual convention September 27-29 in Indianapolis.

Supplier rooms were open to convention goers Saturday afternoon. Exhibits, demonstrations, and industry films were provided by E. & J Swigart and the Nest Company, among others. Beginning at 4:30 Saturday afternoon, featured speakers became the main attractions. Ray Goodman of Goodman Jewelers (who is also an RJA Director and author of RJA's gold pricing charts and system) spoke on "Pricing Gold Repairs and Merchandise for Profit." Art Stievers of DeBeers Diamonds' Advertising Agency gave a presentation entitled "Inside DeBeers Diamond Mines and the Christmas '80 Diamond Market."

Saturday's activities concluded with dinner and entertainment at the Beef 'N Boards Dinner Theater.

At 8:30 Sunday morning, activities resumed with Zantech's Lou Zanoni talking on "Methods of Repairing or Replacing Push Buttons" and on "Digital Watch Failure Analysis." Jacques Reymond of Watchmakers of Switzerland followed with "Repair and Service of Swiss Watches and Where the Swiss Watch Manufacturers are Headed." Later in the morning, a panel of watch service industry experts handled a question and answer session. The panel moderator was John Tobias, WAI President.

Wives of the male watchmakers were kept busy Sunday morning with a Mary Kay Makeup analysis and demonstration followed by a coffee break. The
(Continued on page 31)



We Salute These New Members!

ACHODIAN, Noubar—New York
ALEXANDER, Gerald L.—Texas
AYER, Ken—Kansas
BEITTEL, Don R.—New Jersey
BELL, W. Patrick—Florida
BENAVIDES, Noel P.—Texas
BOWEN, John P.—New York
BRUNSON, Thomas A.—South Carolina
CASTRO, Alfredo—Florida
CHAMBERS, Bernard J.—Missouri
CHRISFIELD, George H.—New York
CHUNG, Hyun G.—California
CIESLAK, Walter J.—California
COOLEY, Thomas S.—California
CORT, Randy—Idaho
COURT, Victor G.—Puerto Rico
CRANEY, Tom—N.S.W., Australia
D'ABREAU, Anthony L.—New York

DANZIGER, Lawrence—New York
DE ARELLANO, Max Ramirez—Puerto Rico
DEORSAM, Irvin A.—Texas
DOUPOULA, Seda—New York
DYER, Johnny W.—Texas
FIGUEROA, Maria L.—New York
FISCHBECK, Clifford E.—Texas
FISCHER, Harry G.—Kentucky
GARNER, C. R.—Texas
GONZALEZ, Gonzalo J.—Florida
GREEN, John V.—New Jersey
GRIFFITH, Mark—New York
HANCOCK, K. L.—Kansas
HARBIN, Thomas L.—Georgia
HARNDEN, Larry D.—Washington
HAWLEY, Melanie—Arizona
HIEW, John—B.C., Canada
HIGA, James J.—Hawaii
JACKSON, Mary—Iowa
JACOB, Richard J.—Ohio
JOHN, James W.—Texas
JOHNSON, Blair—Utah
JONES, B. G.—Texas
JORDAN, John E.—Montana
KACHURKA, David S.—California
KING, Garland L.—Colorado

KNAPP, Mark—Texas
KRAMER, William—New York
KRILL, Francis M.—California
KRONE, Fred A.—California
LeGAULT, Albert—Minnesota
McGUIRE, Dennis V.—Florida
MAUPIN, Carey A.—California
MILLER, Vern J.—California
MURAKAMI, Kiichiro—New York
O'MEARA, Robert T.—Michigan
PAUL, Steven—Illinois
PRORAK, Emil F.—Illinois
PUDELL, Robert—Illinois
ROGERS, Scott—Illinois
REIMANN, Robert L.—Illinois
REMFREY, Michael—Arizona
SARMIENTO, Edgard O.—South Carolina
SCHEIN, Robert—Delaware
SKAGGS, Kenneth—California
VASQUEZ, Porfirio, Jr.—California
VAYSBERG, Jacob—Minnesota
WALTER, Scott F.—Illinois
WEATHERLY, Steve—Texas
WOLFE, William W.—Maryland
WOODRUFF, David—North Carolina
ZIA, M. Ahsan—Kobe, Japan

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Model HPJ-2. Similar to above except equipped with mechanical chain activated steam release valve, foot pedal control, and low water cut-off.

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Whoosh! With easy Steamaster cleaning there's no drying, no wiping, no lint residue.

Whoosh! Steamaster high pressure steam will remove all deeply embedded dirt, grime, and grease.

women then joined the watchmakers for luncheon.

The WAI Awards Luncheon featured guest speaker Hoyt Hurst, publisher of *Modern Jeweler* magazine. The luncheon was followed by Round Table discussions which included subjects such as jewelry repair, shop security, and colored stones.

There was a post-convention seminar on Monday. The "Zantech One-Day Watch Repair Course" was presented by Lou Zanoni, president of Zantech, Inc. Subjects covered were the oscillator circuit; how to test and repair the LED, LCD, and analog quartz; soldering techniques; substrate repair methods and cleaning techniques; LED, LCD, and analog quartz module testing.

The WAI wishes to thank all of those who were involved in making this convention a success.

CALIFORNIA

There was a meeting of the Central California Watchmakers Guild on Sunday, September 28, 1980.

There was a light buffet dinner consisting of cold cuts, cheeses, and wine. This was the meeting to which members brought their wives. An excellent program was designed to interest them; Bob Novoa presented his slides of the King Tut Treasures.

There were a number of very fine door prizes given away, including a ladies' quartz watch provided by Citizen Watch Company.

IOWA

The Iowa Jewelers and Watchmakers Convention and Trade Show is now history. It was a very successful show and very well attended. The many new exhibitors helped to add spice to the show. The desire of all the exhibitors to come back in 1981 is indicative of the show's success.

The Saturday evening dinner dance was attended by 207 people, and the Best Western Airport Inn came through again with a delicious prime rib dinner with all the trimmings. Many lovely gifts donated by salesmen and firms were given away throughout the evening.

NEW JERSEY

The October 14th meeting was election night for the Watchmakers Association of New Jersey. Elections were held for all offices. Results will be announced in the *Horological Times* at a later date. Also discussed was the AWI meeting that was held in San Francisco this past June.

The September meeting was a huge success. This meeting consisted of a panel discussion which involved members in questions and problems pertinent to today's watchmaker. Members of the panel were Ralph Kalashman, Jack Schecter, and Ann Louise Brakebill.

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and 4" dial diameters.

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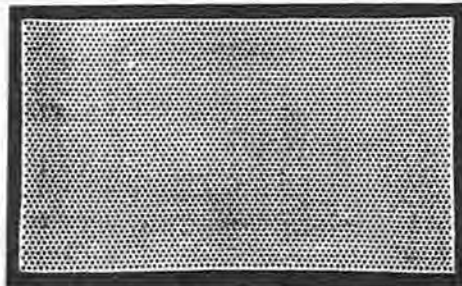
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THE DETACHED LEVER ESCAPEMENT © 1980

The detached lever escapement was invented in 1759 by Thomas Mudge, a very famous English watchmaker. Mudge's escapement was a more complicated design than the detached lever escapement that we have today, but the principle was the same. Although there are many electronic watches being made and a growing trend toward this kind of time-piece, this does not make the detached lever escapement obsolete. Mechanical watches with detached lever escapements are still being made in great numbers, and there are millions and millions in service at this time which require overhauling periodically. There are many very valuable antique watches with detached lever escapements that need to be restored and maintained from time to time. This justifies the need for watchmakers to be trained in the adjustment of this escapement. There will always be a need for watchmakers to service the mechanical watch.

It is not the intent of this article to discuss the theory of the detached lever escapement, but rather to explain the escapement in a practical way for the student and the practical watchmaker who earns a livelihood repairing mechanical watches.

The detached lever escapement gets its name from the fact that the balance wheel is free of the pallet fork except when the roller jewel is unlocking the escapement and is receiving impulse from the fork against the roller jewel. The roller jewel is in contact with the pallet fork for about 20° on each side of the center line. This makes a total of 40° that the balance wheel is not free of the escapement. The balance is detached from the escapement through the other part of its arc of motion.

Figure 1 shows the different parts of a club tooth detached lever escapement. This escapement is a double roller type. View A shows the impulse roller table. This table holds the roller jewel. View B shows the safety roller table. The balance staff is shown in View C. The roller jewel is shown in View D. View E shows the pallet fork horn. View F shows the fork part of the pallet fork. The guard pin is shown in View G. View H shows the banking pins. These pins limit the angular motion of the pallet fork. View I shows the pallet part of the pallet fork. The pallet arbor is shown in View J. View K shows the receiving pallet stone which is sometimes called the R-stone. View L shows the leaving or discharging pallet stone, which is also called the L-pallet stone. NOTE: Sometimes the pallet stones are called the *right* and *left* stones. This can be confusing because the concept of right and left stones is dependent upon from which end of the pallet fork the stones are viewed. In this article, the stones will be known as the receiving stone (R-stone), which is the stone that receives the tooth first, and the leaving stone (L-stone), being the stone that lets the tooth leave the pallet frame. Figure 1, View M shows the escape wheel, which is of the club tooth type. View N shows a club tooth of the escape wheel. View "a" shows the angular motion of the pallet fork. This is 5° on each side of the

line of centers, making a total of 10° for the pallet fork swing. At "b" is shown the crescent in the safety roller. The purpose of this crescent is to allow the guard pin to pass from one side of the line of centers to the other side. At "c" is shown the draw on the receiving stone which is 12° ; "d" shows the draw on the leaving stone which is also 12° . At "e" is shown the clearance angle on the teeth which is usually 17° . At "f" is shown the drop on the leaving stone. This should be $1\frac{1}{2}^\circ$. There needs

to be an equal amount of drop on the receiving stone also, which is not shown in Figure 1. The drop on the receiving stone is called inside drop because it occurs inside the pallet frame. The drop on the leaving stone is called outside drop because it occurs outside the pallet. At "g" is shown the fork slot.

Additional escapement terminology and definitions are as follows:

Bank To Drop The banking screws are turned to a point where the escape

wheel teeth just drop off of each pallet stone. No slide is present at all.

Banking Screws Screws that have a pin set off center in their ends. These screw into the watch plate from the dial side of the watch and are adjustable so their pins can be moved closer together or farther apart in order to give the pallet the proper amount of angular motion. These were used in the older watches and are not used any more in newer watches.

Banking, Solid Solid banking is used in some of the newer watches. This means that the pallet bridge or part of the lower plate limits the angular motion of the pallet fork.

Corner Freedom The clearance between the corner of the fork slot and the corner of the roller jewel as the jewel passes the corner of the fork slot.

Divergence Angle This is an angle of clearance between the angle on the escape wheel tooth and the angle on the pallet stone as the tooth slides across the impulse face of the pallet stone. If the clearance is between the stone and the heel of the tooth, it is called front divergence; if it is between the toe of the tooth and the pallet stone, it is called back divergence. Back divergence is required for good escapement performance.

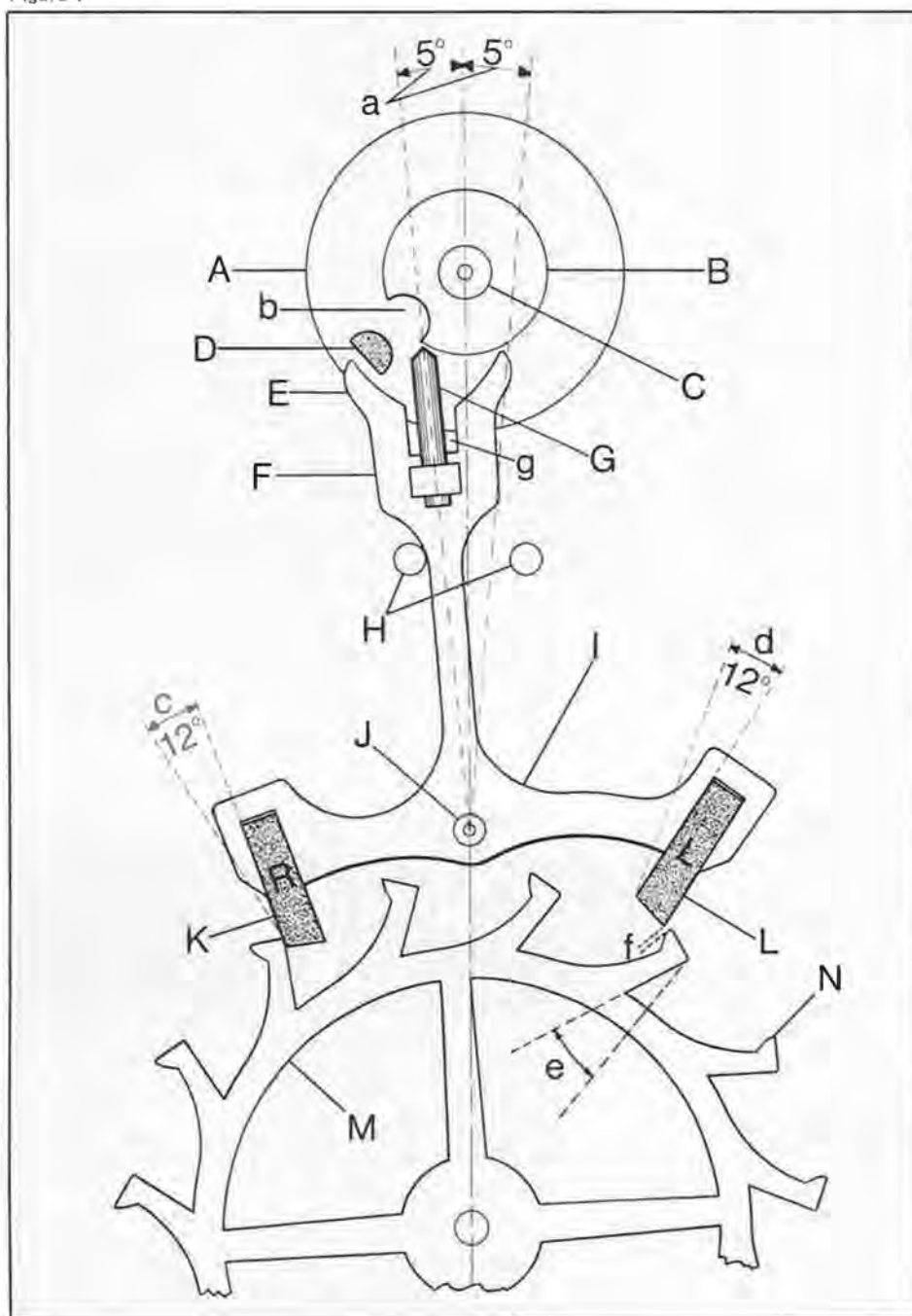
Double Roller A roller table that has an impulse roller to carry the roller jewel and a separate roller called a safety roller to work in connection with the guard pin for safety action. The double roller can be a one-piece or two-piece mechanism.

Draw Draw is an action created by the pressure of the escape wheel tooth against the slanted locking face of the pallet stone. The stone is slanted about 12° in the direction that the escape wheel is traveling. Draw is needed on both pallet stones. The way to test for draw is to lead the pallet fork slightly away from the banking pin; when released, the fork should snap back against the banking pin.

Drop Lock Drop lock is the amount of overlap of the escape wheel tooth on the locking face of the pallet stone at the instant the tooth contacts the stone. The correct amount of drop lock on high grade watches is one sixth the width of

(Continued on page 51)

Figure 1



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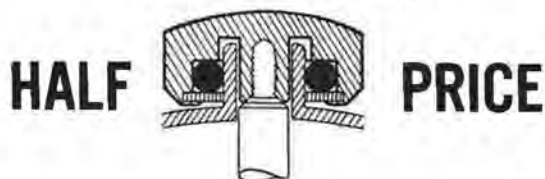
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5.0mm	2.5mm	10	flush
5.2mm	2.0mm	10	flush
5.7mm	2.5mm	9	medium
5.2mm	2.5mm	8	flush

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5.0mm	2.25mm	10	flush
5.7mm	2.5mm	9	medium
5.0mm	2.5mm	8	flush
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Book Review / JOSEPH G. BAIER, PhD

Watches in Colour. Richard Good. Blandford Press Ltd., Link House, West Street, Poole, Dorset, England. 218 pages, 5 x 7 1/2 in., 75 illustrations in color.

The advertising cover for his book states, "Watches in Colour encapsulates the wonders and artistry of the world of watches through the masterly text of author Richard Good and the brilliant camera work of Bob Loosemore. It makes a worthy companion to *Clocks in Colour* in the same series."

Chapters run through a series which can serve as an outline of the book's content: Beginnings of the Watch; The Foliot and the Verge Escapement; National Styles; Breguet and his Influence; The Decoration of the Case; Mechanical Considerations; The Emergence of the Precision Watch; Breguet as a Mechanic; The Lever and Duplex Escapements; Keyless Winding; Guillaume and the Balance Spring; The English Watch Reaches its Peak; Watchmaking in Other Countries; Special Watches.

This book is of small dimensions, being only somewhat larger than the average paperback. However, it would be an excellent addition to the collector's library, particularly the new collector, and can also be recommended for the serious consideration of horologists interested in history, development of timepieces, and their mechanisms and styles.

The book is well written, and well illustrated with its numerous color plates and some line drawings. It is not a "how to" book, but rather one of content. A 32-page glossary with 14 pages describing the color plates, a list of some important European museums, and a bibliography complete the book.

JOSEPH G. BAIER, PhD

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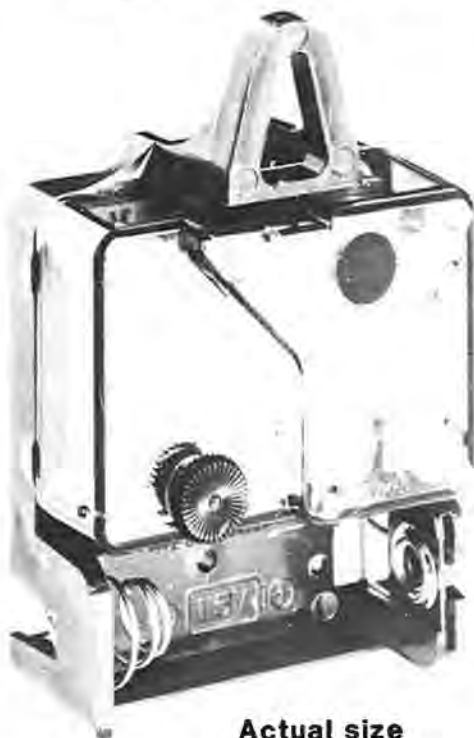
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By Marvin E. Whitney, CMC, CMW



American Chronometer Makers

When one considers the exposure afforded various branches of the American horological industry, it is easy to see that the chronometer branch has been relatively ignored. However, when we view the roles which the various divisions of the horological industry have played in helping to make America a world power, the chronometer must be accorded a large share of that honor. The chronometer was just as highly esteemed by American sea captains and navigators during America's quest for supremacy on the seas as it was in the days when Britain held that title.

America's right to the title was achieved by being able to cash in on fast ships. The first was the schooner, whose fore-and-aft rigging made it a more efficient ship than its predecessors because it could sail "close" to the wind. Later, the development of the American clipper ship gave the world the fastest ship afloat. In 1807, one of the most important events in the annals of water transportation occurred when Robert Fulton and his *Clermont* steamed up the Hudson River from New York City to Albany.

Thus, by America being able to provide chronometers and other navigational services to go along with her fast ships, she was able not only to bring her Western frontiers closer to the industrial East, but also to serve notice to the world that this young nation would soon become a World Power.

Although the names of several American chronometer makers appear on the dial of many chronometers, very little is known about these makers and the part they played in the

development of the chronometer in America, with the possible exception of Hamilton. Some say that very few, if any, made an entire instrument on their own. However, it is questionable whether many English chronometer makers made a complete instrument from the plates up. It was a well-known fact that chronometer parts could be purchased from Prescott craftsmen, which were in turn finished, sprung, and adjusted by known makers. Too, the Chronometer Trials that were started at Greenwich in 1823 were halted in 1835 and not reinstated until 1844 because too many inferior chronometers were being submitted for trials. This brought forth a directive which stated that any maker who wished to submit a chronometer for trial must certify that he was a chronometer maker and that the chronom-

eter submitted was made wholly by himself.

Before discussing the American makers and their contributions, let us return to England and explore the manner in which many of their instruments were manufactured.

We are familiar with the names of many of the famous makers, but few produced a total instrument, solely on their own. The majority purchased their plates, balances, chains, fusees, trains, etc., from Prescott firms and/or individuals, and then finished, sprung, and adjusted them. Between 1800-1850, Prescott, in Lancashire, was the center of England's horological industry. Located in Prescott and the surrounding area was a corp of highly skilled artisans who catered to every facet of the maker's needs and specifications.



A view of Bond's Chronometer Shop as it appears in Timepiece Hall at the National Museum of History and Technology, Smithsonian Institution, Washington, D.C. (Courtesy of the Smithsonian Institution)

From this corp of specialists, chronometer makers would purchase unfinished chronometer plates and the various component parts, and then finish, assemble, and spring them in their own particular manner. This is illustrated by the various affixes and balances which we see in many of the instruments; each one is individualized, for its maker strived in his own imaginative way to overcome the middle temperature error in order to achieve a top rating when submitted for trial at Greenwich and the other observatories. In the early 1840's, this corp of Lancashire chronometer part specialists began to supply plates and trains that were very similar in appearance.

Although England controlled the seas, competition from other countries became increasingly evident. Hence, the demands for an accurate timepiece to determine longitude increased. Chronometer makers in other countries began to challenge England's control of the chronometer market by offering their timepieces for sale to the Navy and merchant fleets. As more and more ships began to ply the seas, not only did the demand for chronometers increase, but the demand for other navigational services, aids, and equipment began to surface. Thus, in order to produce more chronometers, many of the known chronometer makers, such as Dent, Frodsham, Hewitt, Poole, and Roskell, began to rely more and more on this group of Lancashire craftsmen to supply their ebauches; this relieved the makers of mundane work and permitted them to concentrate on the springing and adjusting of their instruments.

By this time, the industrial revolution had begun in America, and the Swiss were beginning to develop mass-production techniques and standardization of parts. However, the chronometer, clock and watch industry in England did not embrace mass production, and this later led to their demise.

To meet the increasing demands of instruments and services, nautical opticians took over the responsibility of selling the finished product and began to handle chronometers, charts, and the repairing and adjusting of navigational instruments. These entrepreneurs were referred to as nautical opticians, as they were formally opticians. Because of their special training and knowledge of instruments, mathematics, and science, they were well qualified to operate this type of business enterprise.

The rapid expansion of the various merchant fleets brought about an increased demand for instruments.

Because of their newly acquired position, these nautical opticians began to make certain demands on their suppliers. One in particular was that their names, rather than the makers', be engraved on the dial. Although many of the makers did not like the idea of having a name other than their own appearing on their instruments, many complied reluctantly. Those that capitulated saw the advantage in having a ready outlet for their instruments. Also, by being able to deal through a middleman (nautical optician), they were relieved of the tasks of rating, stocking, and delivering their instruments.

Dent, Frodsham, Johannsen, and Kullberg were several makers who declined to have any name engraved on their dials other than their own. However, Mercer, Lawson, Poole, and others felt that it was more to their advantage to have a continuous outlet for their instruments and thus, conceded to the nautical opticians' wishes.

Ironically, many of those makers who chose not to concede to the wishes of the nautical opticians were out of business by the early 1900's.

Today, Mercer is the only maker who is still producing two- and eight-day spring detent chronometers. Before 1907, Mercer, like other makers, purchased plates with balances, fusees, and trains from Prescott and then finished them. However, since that time, every part that goes into the production of a Mercer chronometer has been made at St. Albans. This is not surprising,

because since its founding in 1858, Thomas Mercer Ltd. has been a most progressive and innovative firm. The high standards for craftsmanship that were established as a family tradition have been maintained through succeeding generations. The business has passed from father to son, and today, can rightfully claim not only the longest unbroken chronometer manufacturing record in the world, but also the record for the largest number of chronometers ever made. Since the business was founded, Mercer has made over 30,000 chronometers.

Now let's return to the American makers. Although several American makers made a few complete instruments, and others produced one or two, the vast majority purchased their instruments from abroad. Mercer, Johannsen, Kullberg, Poole, Tobias, Parkinson and Frodsham, and others supplied complete or semi-complete movements to these makers. As mentioned previously, you could purchase any "ebauche" you desired in Lancashire, and since

*"Thus, by America being able
to provide chronometers and other
navigational services to go along with her fast ships,
she was able not only to bring her Western
frontiers closer to the industrial East,
but also to serve notice to the world
that this young nation would soon become
a World Power."*



Chronometer Pinion Cutter from the William Bond & Son Shop.
(Courtesy of the Smithsonian Institution)

so many did, it is rather difficult to identify a particular maker's movement—except from the “finishing.”

In the early 1900's, Kullberg and Johannsen finished some chronometers for Mercer, and Mercer, in turn, made balances for them. Mercer has made chronometers for nearly four hundred different makers and/or nautical opticians. Mercer's instruments won their share of laurels when submitted for trial at Greenwich. Also, many of the chronometers which Mercer made for these nautical opticians and/or makers, when submitted for trial at Greenwich, were also accorded high ratings, but not under Mercer's name.

Although some of the old New York Business Directories list a number of chronometer makers and firms (nautical chandlers, as they were referred to here in America), by and large, most of the makers were very similar to the nautical opticians in England. They not only sold chronometers which carried their names, but they also repaired and rated chronometers, adjusted compasses, collimated sextants, and provided charts, logs, books, and other nautical paraphernalia. However, we must not be too quick to condemn the American maker for, as we have seen, many of the noted London and Liverpool makers did not make a complete chronometer either. Therefore, just because a chronometer bore the name of an English maker was no indication that the chronometer was made entirely by that maker, any more than it was an indication of such in the case of the contemporary American makers.

Some of the old chronometer makers that I have

During Captain James Cook's third voyage (1776-1780) in search of a Northwest sea passage to Europe, he sailed close to the central Oregon coast. While sailing by one particular point of land, Captain Cook named it Cape Perpetua in memory of a Christian martyr who died in Carthage on that same date in 203 A.D. Today, Cape Perpetua, which is near Yachats, Oregon, is the same primitive place Cook saw from his ship, the Resolution, except for a visitors' center and a network of nature trails maintained by the U. S. Forest Service.

When the news reached the Colonies of Cook's probe of the Pacific Northwest, several Boston merchants pooled their resources and sent out two ships, one under the command of Robert Gray. In 1792, this young Captain discovered a mighty river which he described as flowing out of the forest and which he named the Columbia, after his ship. Then, in September of 1810, John Jacob Astor's first ship, the Tonquin, sailed from New York, bound for the Columbia by way of Cape Horn. After a rough voyage, his men reached the mouth of the Columbia in March of 1811. On April 12 of the same year, construction of Astoria was begun. Establishing such a settlement held great diplomatic importance later on when the United States and Great Britain began to wrangle over who held title to the Pacific Northwest.

Although the Russians and the English attempted to drive the Yankees out of Oregon, it did not deter pioneering men and women from traveling to the Northwest, whether it be over land or around the Horn. As more people began to settle the West, and still more desired to, the demand for transportation and goods increased. This opened up a new era in shipbuilding.

In the early 1800's, shipyards in New England and New York began building clipper ships, the fastest ships afloat. Clippers sped passengers to the West and raced for cargoes. Although many Captains preferred English chronometers, William Bond provided a ready service, not only being able to outfit new ships, but also being able to repair and service their chronometers.

interviewed have stated that, contrary to popular belief, a number of chronometers were made entirely by the New York firms of Bliss and Negus. However, the general consensus is that the majority of the instruments made here were ebauches. Thus, most of the American makers purchased their plates,



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trains, fusees, chains, etc., from England, only to spring and finish them here.

Another fact that has been most difficult to substantiate is the actual number of chronometers that were made by these American makers. Only estimates are available. Since the U. S. Naval Observatory does not have or offer an historical chronometer service as is provided by the Royal Observatory in London, little proof is available as to number or dates of manufacture.

William Bond and Sons of Boston was the first firm to manufacture chronometers in America. William Bond was born in Plymouth, England in 1754. William was the son of Thomas who was a chemist (surgeon) in 1750. William was married to Hannah Cranch, and through that union they had six children; Thomazine Elizabeth Fielder; Thomas and William, who both died in infancy; another son, also named Thomas, who came to America as an infant; and Hannah and William who were both born in America.

William Bond first visited America in 1784 and lived for a time in Boston. There, in 1785, he became a free citizen of Massachusetts by a special act of the General Court.

He returned to England, where he chartered a brig and brought his family back, arriving in Boston in May, 1786. In 1788, he moved to Falmouth (now Portland) Maine where he started a shipping business, shipping lumber to Bristol, England. He also established a branch on Frenchman's Bay. This business venture proved unsuccessful, and in 1790, he and his family returned to Boston where he began a business as a silversmith and watch/clock maker, both trades that he had learned as a young man in London.

In 1793, William established the firm of William Bond and Son at 154 Marlboro Street and began to import clocks

and watches from England. Soon he became an agent for Kullberg chronometers and also began to import chronometer watches. Bond remained at the Marlboro address until 1810, when he moved to 26 Congress Street. Here the firm remained for forty-two years, although William himself died in 1848. The next move was down the street to 17 Congress Street, and then in 1876, to 97 Water Street. In 1889, the firm was moved to 134 State Street and was operated by Mrs. S. A. C. Bond, J. Morton Clinch, and William C. Bond, Jr. After fifteen years at the 134 State Street address, the business was moved to 148 State. There it remained until 1923 when it was moved to 22 Beacon Street. It was about this time that Bond stopped manufacturing chronometers, although the firm continued to service and rate chronometers.

In the early 1930's, the Bond family sold the firm of William Bond and Sons to a Mr. Suren Hekemian. Mr. Hekemian continued the clock, watch, and jewelry business under the Bond name until his death in the mid-seventies. This brought an end to the Bond firm, but certainly not to the Bond name.

The photograph of Bond's shop was purchased by the Smithsonian Institution in 1960 from Mr. Hekemian. The Smithsonian then reconstructed the shop in Timepiece Hall of the Smithsonian Institution.

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PROFIT Through PROFESSIONALISM

By Warren E. Rogers



PRICING PROFESSIONAL SERVICES

The typical bill for automotive repair lists the various parts supplied and an hourly charge for services rendered. The latter is known as the "shop rate" and is arrived at by a relatively simple process of cost considerations. It includes all fundamental overhead items such as rent, utilities, property taxes, advertising, supplies, etc. It also includes compensation for the mechanic who performs the service. To the total of overhead and labor is added a most important ingredient: profit. This represents a return on the investment in equipment, tools, and material.

Unfortunately, the average watchmaker is not using this very acceptable method to arrive at the cost of his professional service. Too often, he bases his price upon what his competitor down the street is charging, or on the average price for "cleaning and oiling" shown in surveys conducted and published by trade publications. He does not know the quality of work performed by his competitor nor of those who contribute survey information. A recent decision by the federal government all but prohibits trade publications from conducting and publishing such price surveys in the future. We can only hope that the unavailability of this information will bring about a more realistic approach to pricing watch repair based on the realities of overhead, labor, and profit.

The wages paid for a skill are highly competitive in the free enterprise system. An employer will experience great difficulty in keeping his employees if the wages he pays are not in line with those being paid by his competitors. At the same time, we must recognize that all watchmakers do not possess the same degree of skill nor the same proficiency in applying their skill. We should recognize that there is a level of skill required in the repair of a fine watch that is not required in the repair of a watch of average grade. We should also recognize that an element of efficiency or speed may be important in servicing an average watch, but relatively unimportant in servicing a fine watch. We know that the shop rate charged in a Rolls Royce agency is higher than that charged in the agency of a less prestigious automobile. We also know that the labor element of the shop rate is higher.

*"...an element of efficiency or speed may be
important in servicing an average watch,
but relatively unimportant in servicing a fine watch."*

In the final analysis, it is the public that determines the value of our skill by either accepting or rejecting the price we place on our labor. As discussed in the previous articles, we can use good salesmanship and a professional image to make the public more appreciative of our skill and the amount of time involved in providing our services.

For the sake of illustration, let's assume we have a watchmaker who has worked for a retail jeweler for several years, but who has now decided to open his own shop where he will be selling his own skill. His wife will be his only employee, and she will handle the bank deposits, perform minor bookkeeping, wrap packages for mailing, order parts, dust the establishment, etc., all without compensation other than tender love and affection, or with compensation. (See "Tax Talk" in the August, 1980 issue of H. T.) He does not have the exact figures to provide all the annual anticipated costs so he must estimate these as closely as possible. A good source for a list of expenses to be considered would be the income tax form schedule C for independent business people. Our watchmaker has enough experience to know the approximate time required to do various watch repair operations such as replacing a stem and crown, replacing a mainspring, performing a complete overhaul, etc. Such information concerning time is comparable to the flat rate manual used by automotive agencies, and it refers to time and not dollars. In calculating the time required to perform the work, our watchmaker must consider an element of time for selling, parts procurement, and delivery to the customer if he is involved in these operations. It is not difficult to arrive at the number of hours to be worked in a year. On a forty-hour basis, it is 2,080 hours, or 2,496 hours based on a six-day week. Now the question is, what is the skill of the watchmaker worth per hour? Stated another way, what value will the public place on one hour of the

professional skill he provides? Obviously the public will not place the same value on the skill of all watchmakers because they will recognize that some individuals are more highly skilled than others. The skill of all surgeons is not the same, and the public accepts the higher fee of the fine surgeon on the basis of the skill he provides. Such differences are the result of the reputation of the surgeon or public awareness of the complexity of the operation. The public readily accepts that the restoration of antique timepieces requires a high degree of skill on the part of the watchmaker.

Let's assume that our watchmaker considers himself to be a mechanic of slightly above average skill—better than most, but not as good as a few. As he looks at the community around him, he can observe the rates and fringe benefits being paid other skills that he considers comparable: tool and die makers, precision machinists, cabinet makers, etc. Such information is obtainable by reviewing the classified ads of the local newspaper or by contacting the local state employment office. Basically, our watchmaker is asking whether he is entitled to the same hourly rate as that being paid to those skills he considers comparable. Fringe benefits that are paid by the employer, such as vacation pay, sick leave, paid holidays, medical insurance, and retirement insurance, must be added to the basic wage. As you review the wages paid in classified ads or other survey information, you should add no less than 10% to cover this indirect form of compensation.

Inserting hypothetical figures into our problem might produce the following (based on a 40-hour work week):

OPERATING EXPENSES

Advertising	\$520
Bad Debts	75
Bank Charges	75
Car Expense	\$20

Depreciation	300
Dues and Publications	100
Insurance	420
Laundry	100
Legal Services	150
Office Supplies	250
Postage	95
Rent	3,300
Repairs	175
Supplies	600
Property Tax	380
Telephone	300
Travel and Entertainment	550
Utilities	1,080
Uniforms	60
Educational Seminars	300
Tools	350
Janitor Service	300
Licenses and Permits	200
Donations	200
Miscellaneous Expenses	500

Total Expenses	\$10,900
Total Wages (2,080 hrs. @12.50)	26,000
Profit (10% of \$5,000 invested in tools and equipment)	500

Grand Total \$37,400

Dividing the grand total of wages, overhead expenses, and profit by 2,080 hours, we would arrive at a shop rate of \$18.00 per hour. This means that for every hour of professional service, the watchmaker would have to charge \$18.00 to pay expenses, an adequate wage, and produce a reasonable return on investments in tools, equipment, and material. The profit item represents compensation for the use of money invested in equipment, hand tools, material systems, etc. Let's look at profit another way. If the money we have invested in these items were instead deposited in the bank, we would receive an interest payment (profit) for the use of our funds. The retail jeweler who hires a watchmaker must go through a similar process by allocating a share of his overall expenses

(Continued on page 55)

The 1980 AWI Horological Tour

In last month's coverage of the 1980 AWI Tour, we featured highlights of the group's stay in London. This month, we follow them through the rest of the British Isles.

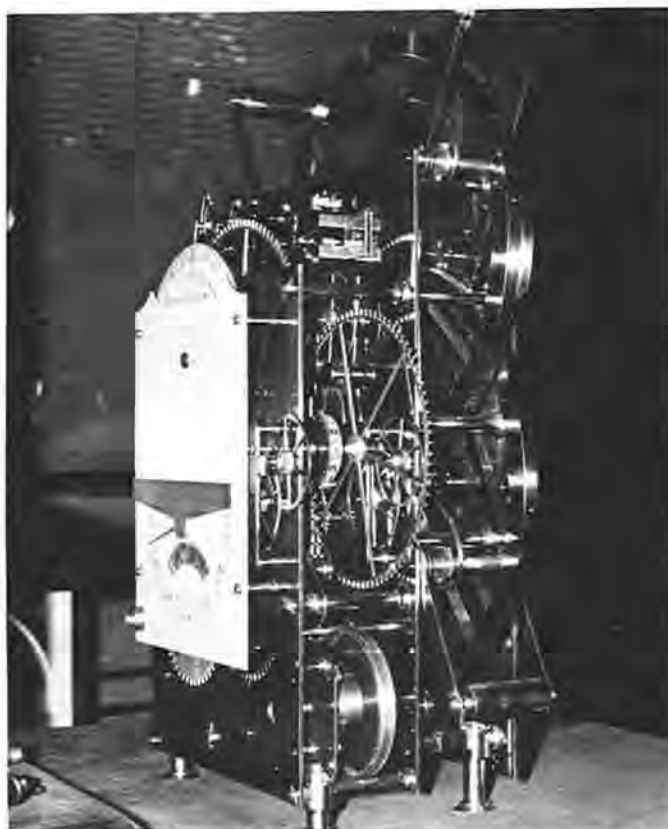
The 1980 AWI Horological Tour group, under the direction of Henry B. Fried, climaxed their eventful stay in London with a Thames boat trip to the Greenwich Observatory at the zero meridian. The Observatory's horological museum is highlighted by four running Harrison chronometers and Tompion clocks.

After making final visits to various favorite London area attractions, the group toured by bus to Stonehenge, Salisbury Cathedral, Coventry, Bristol, and picturesque Bath with its hot mineral baths developed by the Romans. In Bath, numerous antique shops featuring clocks and watches brought out the latent purchasing talents of some members of the group.

Oxford's Ashmolean Museum with its fine collection of early and rare watches and clocks was seen at close range and lectured upon by its curator. As usual, a few details were added by tour leader Fried. Continuing on to Stratford-upon-Avon, the group visited Shakespeare's home at the height of the spring blossom season, and with cameras clicking, captured the scenic and floral beauty. In the evening, as part of the tour, the group was treated to a performance of *Romeo and Juliet* at the famed Shakespeare Theatre.

Quaint Chester with its many shops and weekend shoppers, colorful paraders, and town criers brought back bits of historic England. Lake Windermere provided a relaxed period with time for boat rides and golf. Continuing on to Gretna Green, the border town of Scotland, the group was treated to colorful, local entertainment.

Edinburgh's castles, parks, and museum with its horological exhibits were visited with restful periods for shopping. Later a visit to the Timex factory allowed the group to view manufacturing, assembly, and testing of new watches.



Harrison chronometer No. 3, viewed by the tour group at the Greenwich Observatory Horological Museum.

A gracious reception by their executive staff was most refreshing and enlightening.

While in Edinburgh, a group visited the home of William Wilkes, a collector who also does his own repairs. It was a treat to be able to view a Scottish home, Wilkes' clocks and chronometers, and workshop.

Westclox, too, provided a pleasant reception prior to a thorough inspection of the factory. Here the group



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witnessed the entire process involved in making the clocks—from the raw materials to the completed cased and timed clocks.

Lock Lommond, the Trossachs, and the Firth of Forth also were visited leisurely in days prior to the short flight from Glasgow to Dublin. Dublin, a busy and beautiful city with a famous university and many varied shops, captured the interest of the tour group. We visited Limerick and the famous Blarney Castle where almost all our group kissed the stone with hopes of acquiring that fabled Irish eloquence (if only manifested after much wine and food at the Bunratty Castle where the group spent their last evening). At the Castle, the entertainment was provided by singers and harpists dressed in Medieval costumes, entralling the tour group with sweet, old, melodious Irish songs. The final days were spent sight-seeing around the Ring of Kerry with its rugged cliffs and shoreline—locale of the award-winning movie *Ryan's Daughter*.



Workers at the Timex Factory

Limerick and that very large duty-free port of Shannon gave the last minute shoppers an opportunity to catch up on purchases.

Canvassing has already begun on tour sites for 1981. Some tour members have expressed a desire to visit Egypt, Israel's diamond markets and workshops, the Jerusalem Museum of Islamic Arts with its large collection of Breguet watches, the Maritime Museum at Haifa with its collection of navigational instruments, and the holy shrines of all religions. On the way home, stops are planned in Turkey to visit the famed Topkapi Museum and Seraglio, Greece, and finally the Basle Watch and Clock Fair in Switzerland. Others have expressed a desire for a tour including Switzerland, Belgium, France, and Holland via Western Germany. Interested would-be tourists should voice their desires and opinions by writing to tour director Henry Fried in care of the AWI.

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QUESTIONS AND ANSWERS

(Continued from page 14)

best practice on all stopworks timepieces to use only the middle portion of the spring for timekeeping. In other

BENCH TIPS

(Continued from page 26)

You are right—this is the first jewelry repair tip I've used in this column since the birth of the H.T., and dad burn it, you blabbered it to Buddy Carpenter, who scooped me by using it in the NCWA news letter. No more of your tips will be printed unless I get an exclusive!

Here is another first: I will describe all the facts and see if you can figure out the problem with this "comeback." (Come to think of it, I don't ever remember having a "comeback" before.)

This dignified, retired, old-maid school teacher rushed into my shop one day, shoved her watch at me, and stated, "When I was on vacation in Switzerland some years ago, I bought this watch, and it's never been satisfactory—always stopping. I've sent it back to them three times and it still stops. I've been told if anyone can repair it, you can. Price is no object. I want it fixed."

The watch was an 18K yellow gold Bucherer with an AS 969 movement.

words, in such a seven turn mainspring, when the watch is fully wound controllably, let down one full turn and then connect the stop works. This will then allow five full turns for running; the weakest and the strongest parts of

With my ego properly pumped up and \$\$ signs in the eyes, I gave her a good estimate (for me) for an overhaul. Without batting an eye, she said, "Call me when it's ready. I'm in the book," and she zipped out the door.

I'm still scared of school teachers, so I gave this watch the super-duper going over—or as Orville Hagans would say, "Restored the watch": disassembled it completely; examined all parts with a 10-power loupe looking for a stopper problem; couldn't find one; replaced steel mainsprings with alloy spring; replaced stem and crown; cleaned movement; lubed mainspring. The endshake and sideshake were just right on the barrel arbor. Reassembled movement and carefully oiled; checked endshake and trueness of all wheels. Escape wheel would back up two rounds on train freedom check. Checked lock drop shake, rattle and roll; checked balance wheel for burred or bent pivot; checked for poise; assembled balance; trued hairspring in round and flat; set beat; checked freedom of guard pin. End-shake in balance was perfect and with full power on train,

that spring will not be used. This is the general practice with clocks and watches with stops works.

Thank you for your kind remarks about my material in the Horological Times. T-13

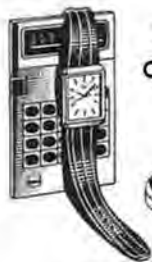
balance wheel would start up when stopped on either side with roller jewel just engaging the pallet. Not to brag, but that watch made rates like a 992B Hamilton on the timing machine. It ran for over 34 hours before it stopped.

I suspected that she wasn't winding the watch all the way up and found out this was true when the watch was delivered. She was afraid that overwinding would cause it to stop. I gave her the full lecture on how you could not wind a lever-type escapement enough to make it stop, and how this misconception was a carry-over from the days of the cylinder escapement. Completely wind it once a day and it won't stop. (Isn't it nice to be able to teach an old-maid school teacher something?)

Four months later she stormed into the shop and, with that school teacher voice of authority, let me know that you could wind a watch too tightly and make it stop. However, until a week ago, it had kept perfect time and had not stopped, although she completely wound it once a day as instructed.

(Continued on page 48)

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BENCH TIPS

(Continued from page 46)

I kept my big mouth shut and checked the watch (which was running) on the timer. It was making perfect rates in all positions. I wound it fully and it stopped in less than one minute!

Red faced and humbled, I asked her to leave the watch with me and

apologized for the inconvenience. I assured her that I could find the trouble.

While checking the watch, I discovered that you could wind it within half a turn of fully wound on the ratchet wheel, but beyond that, it would stop within 20 to 30 seconds.

The mainspring barrel was not open, and you could force on the crown when fully wound and make the watch re-bank.

I'll bet any watchmaker who writes or calls, that he cannot tell me what the problem was.

Look for the answer in next month's Bench Tips!

Share your tips by sending them to: Jingle Joe, 265 N. Main St., Mooresville, NC 28115.

TIME

THE ROCK QUARRY

(Continued from page 18)

quiver. I said, "Save it for somebody else. I've already been through that bit today."

She opened her purse, took out the money, and paid me for the repair.

"When can I get it?" she asked.

"Whenever I get it finished,"

I said. "Check with me in three or four weeks—and don't bug me about it or it may take longer than that."

I could feel the surge of power coursing through my veins. It felt good being a rotten person. I realized

what I had been missing all these years. I thought to myself that never again would I listen to the poor-mouthing of these people. I noticed one of the saleswomen looking at me and said to her, "What are you looking at? If you don't have anything to do, I'll find something for you." She turned and started to straighten the stock.

As the elderly customer started to leave, she turned and asked, "Will you be over to dinner on Sunday?"

"Yes," I answered. "I'll be there about one o'clock—Mother."

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PICKLE BARREL

(Continued from page 13)

Therefore, it is important that your phone still be connected with his dispatcher. Everything presented in this program was of value, and following these procedures could save your life, or my life, as well as increase the chances of recovering a loss. Most large companies instruct their employees to give a robber whatever he wants, for they want no dead heroes as ex-employees. This makes sense as we are issued only one life.

Although retail stores seldom see state or federal safety inspectors, I have always welcomed them, for they are trained to spot unsafe conditions. I always put forth every effort to correct any problems which they point out because it is my safety that is at stake. I never try to cut corners for economy's sake when it could create an unsafe condition.

Unfortunately, experience has always been the best teacher; we all have a tendency to ignore advice, especially

if following it would mean time or money lost. I know that I am guilty of this. Most of this article has been based on my experiences of passing up good information that could have helped me avoid many mistakes and problems. Take all or any part of it for what it is worth to you, and if it saves one person from an accident, injury, or problems, it has been well worth the time spent in writing it.

The next article will deal with creating illusions in doing jewelry repair.

TIMES

WATCH ADJUSTMENTS

(Continued from page 17)

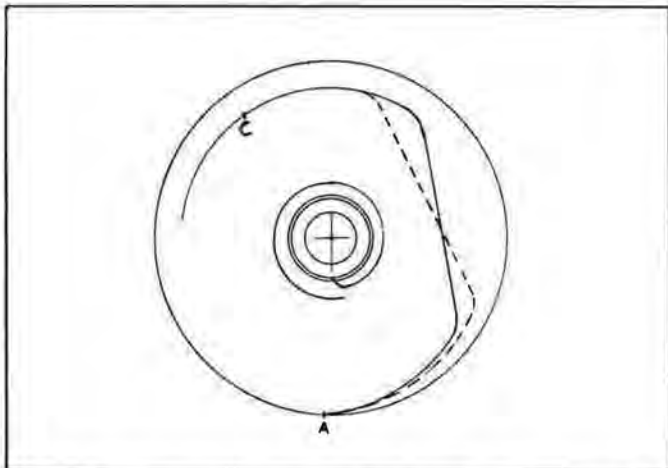


Figure 4. Direction of manipulation to speed up short arcs of a left-handed spring.

is altered in order to speed up or slow down certain amplitudes, the location of the center of gravity and the length of the overcoil in degrees will be changed. With this in mind, we must at the end of the operation, check the length of the overcoil and correct it if necessary. Usually one has to move part of the overcoil back into the spiral every time the rules require moving the overcoil closer to the staff. The reason for this is simple: When the overcoil is moved closer to the staff, its length in degrees is always increased and vice versa. If we fail to make this adjustment, the hairspring will not develop concentrically and further manipulations will be necessary, resulting in a vicious circle.

TIMES

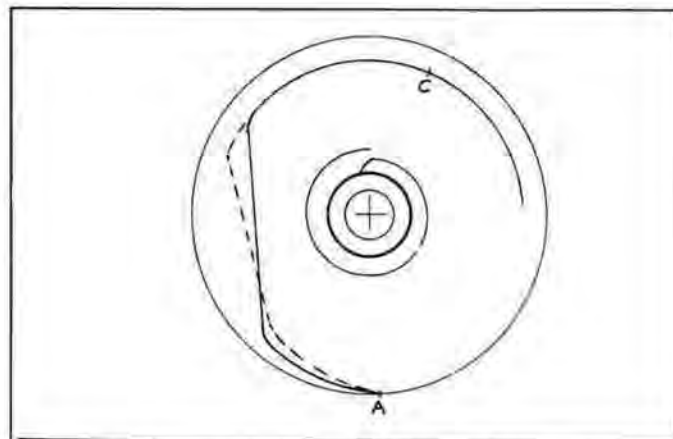


Figure 5. In this situation, the short arcs will be faster when the overcoil is moved away from the staff.

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Coleman Memorial Fund Student To Study Clock Restoration In England

The trustees of the American Watchmakers Institute Education, Library, and Museum Trust Fund have selected Dean H. Armentrout of Laguna Beach, California as the first recipient of the J. E. Coleman Memorial Fund award. Mr. Armentrout will study clock restoration at the West Dean College, West Dean Chichester Sussex, England.

Mr. Armentrout was born in Washington, D.C. in 1951; he moved to Southern California in 1974. It was in California that he became interested in clock repairing. He has served an apprenticeship and has followed a rigid program of self-education. Mr. Armentrout and his wife Elisabeth are ardent clock collectors and have done research-related work for Ward Francillon, 1st vice-president and chairman of research of the National



MILTON C. STEVENS



Association of Watch & Clock Collectors.

The West Dean College is an independent adult college for the crafts, administered by the Edward James Foundation. It is situated in beautiful countryside between the Downs and the sea. In converting West Dean House into a residential college, the original character was preserved as far as possible, to provide a relaxed country house atmosphere. The rooms on the ground floor remain much as they were and include a library, a lounge-hall and bar, a music room, and a conference room. The original stable

block, now converted, together with other studios in the main building, provide a flexible and generous working area. The dining room and kitchen are conveniently situated between the main house and the workshops. Students are expected to spend many of their evening hours in the well-equipped workshop experimenting and practicing with the techniques presented during regular classroom hours.

The Coleman Fund was established in 1975, after the death of J. E. Coleman, by his life-long friend, Orville R. Hagans. The purpose of the fund is to lend financial assistance to serious students who aspire to study clock repair and restoration. The individual should have potential to return to the craft, in some measure, the knowledge and talent which it lost with Mr. Coleman's death.

More than sixty of Mr. Coleman's friends and admirers have thus far contributed to the fund in order to perpetuate the work of Mr. Coleman. Commenting on the selection of Armentrout, Orville Hagans stated, "When we first met Dean Armentrout, Mrs. Hagans and I immediately noted his physical resemblance to Jess Coleman. While interviewing the Armentrouts, we were impressed with their sincerity and determination to secure for Dean the training required for him to become a leading

clock restorer. We are confident that with the aid of his wife, Elisabeth, Dean Armentrout will become a clock restorer in the finest tradition of Jess Coleman."

The Coleman Fund is a per-

petual one which will aid other such aspiring individuals who wish to expand their skill and knowledge in the Jess Coleman tradition. Contributions can be

sent to the J. E. Coleman Memorial Fund, AWI Central, 3700 Harrison Avenue, Cincinnati, Ohio 45211. Gifts are tax deductible.

TIMES

TECHNICALLY WATCHES

(Continued from page 35)

the pallet stone; on lower grade watches, it is one-fifth the width of the stone.

Escapement Sequence Roller jewel enters fork slot; escape wheel tooth unlocks; impulse takes place; drop occurs; drop lock takes place; slide occurs; fork reaches banking pin.

Fork Horns The purpose of the fork horns is to furnish safety action to the escapement when the guard pin is in the crescent of the safety roller.

Fork Slot The slot at the end of the fork between the horns of the fork that the roller jewel works in.

Function of Escapement Changes circular motion of the train wheels to vibratory motion of the balance wheel.

Guard Pin A pin in the fork end of the pallet fork that works in connection with the edge of the safety roller to prevent the escapement from going out of action. In the case of a single roller escapement, the guard pin stands up from the top of the fork and works in connection with the edge of the impulse roller.

Guard Pin Freedom This is the clearance between the guard pin and the edge of the safety roller table when the guard pin is out of the crescent.

Heel This is the corner of the club tooth that strikes the locking face of the pallet stone at drop lock.

Impulse This is also called lift and occurs as the escape tooth slides across the impulse face of the pallet stone. In the case of a club tooth, part of the impulse is on the tooth and part on the stone.

Impulse Planes The angle on the end of a club tooth and the angle on the end of the pallet stone. See Figure 2.

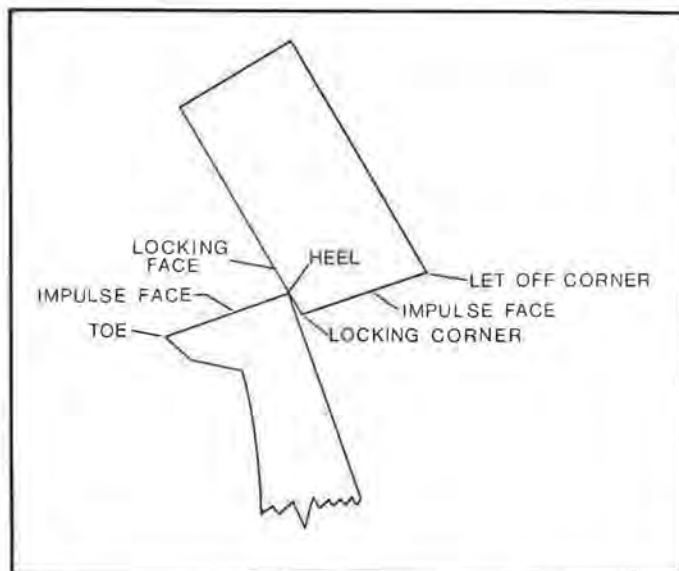


Figure 2

Impulse Roller The roller table that carries the roller jewel.

Jewel Pin Shake The freedom of the fork on the roller jewel at the instant of drop lock.

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Lift on Stone The impulse angle on the end of a pallet stone. See Figure 2.

Lift on Tooth The impulse angle on a club tooth. See Figure 2.

Lifting Planes Same as impulse planes.

Locking Face The face of a pallet stone that the escape wheel tooth rests on while locked up. See Figure 2.

Over-banked When a watch is over-banked, it is out of action. The roller jewel is locked up behind the horn of the fork.

Pallet The part of a pallet fork that holds the stones.

Pallet, Circular An escapement that has its stones planted so the centers of their impulse faces are the same distance from the center of the pallet arbor pivot.

Pallet, Equidistant An escapement that has its stones placed so the locking corners of the pallet stones are the same distance from the center of the pallet arbor pivot.

Pallet, Semi-Equidistant A pallet that has its stones planted so that points half way between the centers of the stones and the locking corners are the same distance from the center of the pallet arbor pivot.

Passing Hallow The crescent in the roller table that allows the

guard pin to pass from one side of the line of centers to the other side.

Pin Pallet An escapement that has pins on which the escape wheel teeth lock, rather than jewels.

Rake The clearance angle on the escape wheel tooth leading from the locking corner of the tooth to the rim of the wheel. This is usually 17° . See Figure 1, View "e."

Re-banking When a watch is re-banking, it is taking too much motion which is usually caused by a mainspring that is too strong.

Roller Jewel The jewel that is set in the impulse roller that works in the fork slot to unlock the escapement and to receive impulse by the fork slot when the escapement is unlocked.

Roller Jewel Freedom The freedom of the roller jewel in the fork slot. This freedom should be .02 mm.

Roller, Safety The roller that works in connection with the guard pin to prevent the escapement from going out of action.

Safety Action A condition that is checked to make sure the tooth remains locked on the locking face of the pallet stone when corner freedom and guard pin freedom is checked.

Single Roller A single roller table both carries the roller jewel and acts as a safety roller. A crescent cut in the edge of the

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roller in front of the roller jewel allows the guard pin to pass from one side of the line of centers to the other side. The guard pin stands up from the top of the fork.

Slide The action that takes place just after drop lock as the stone goes deeper into the escape wheel while the fork continues on to the banking pin. The tooth slides on the stone as the stone goes deeper into the wheel.

Toe The part of the club tooth that leaves the pallet stone last. See Figure 2.

Tooth Clearance The angle of clearance between the angle on the locking face of the pallet stone and the escape wheel tooth when the tooth is locked up.

Total Lock Drop lock plus slide equals total lock.

Figures 3 and 4 show the difference between the fork and roller design of the single and double roller escapements. Figure 3 shows the single roller escapement. View A shows a top view of the fork and roller table. Point "a" is the roller table which serves as an impulse roller and safety roller combined. Point "b" is the crescent in the edge of the roller which allows the guard pin "c" to pass through from one side of this line of centers to the other side. The safety action is between the guard pin and the edge of the roller table. Figure 3, View B shows a side view of the single roller escapement. Point "a" is the guard pin and "b" is the roller table. Note that the guard pin projects up from the top of the fork. Usually the guard pin is curved if the edge of the roller table is straight. If the edge of the roller table is rounded, the guard pin can be straight. The guard pin freedom is adjusted by bending the pin toward or away from the table.

Figure 4 shows the double roller escapement. View A shows a bottom view of the fork and roller tables. Point "a" is the impulse roller. Point "b" is the safety roller. Point "c" is the crescent in the safety roller, and Point "d" is the guard pin. If this guard pin is too short, it can be stretched a small amount or replaced with a longer pin. If the pin is too long, it can be filed or stoned to the proper length. Figure 4, View B shows a side view of the double roller escapement. Point "a" shows the impulse roller, Point "b" shows the safety roller, and Point "c" shows the guard pin. To be correct, the guard pin must be straight and centered on the edge of the safety roller. The roller jewel must have sufficient clearance between its end and the guard pin. There should

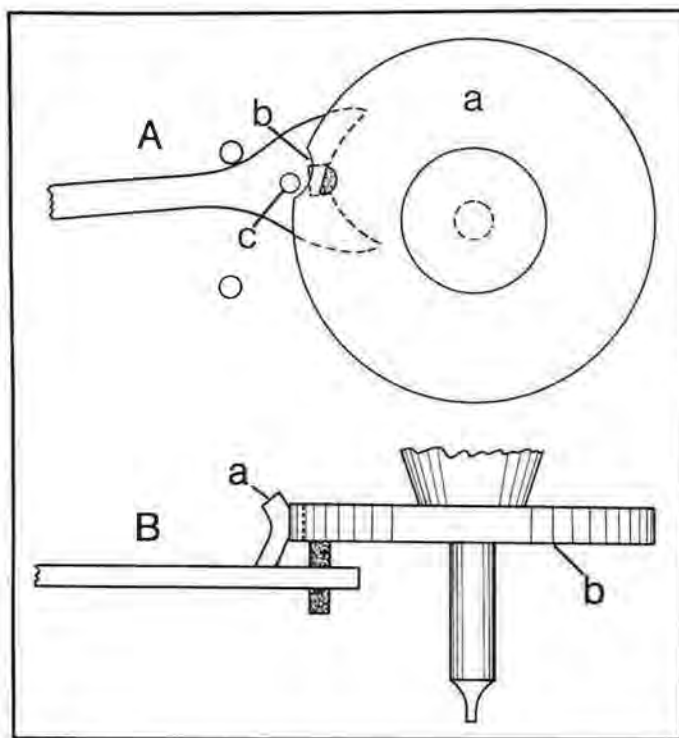


Figure 3

be sufficient clearance between the fork and the impulse roller. The safety action is between the end of the guard pin and the edge of the safety roller.

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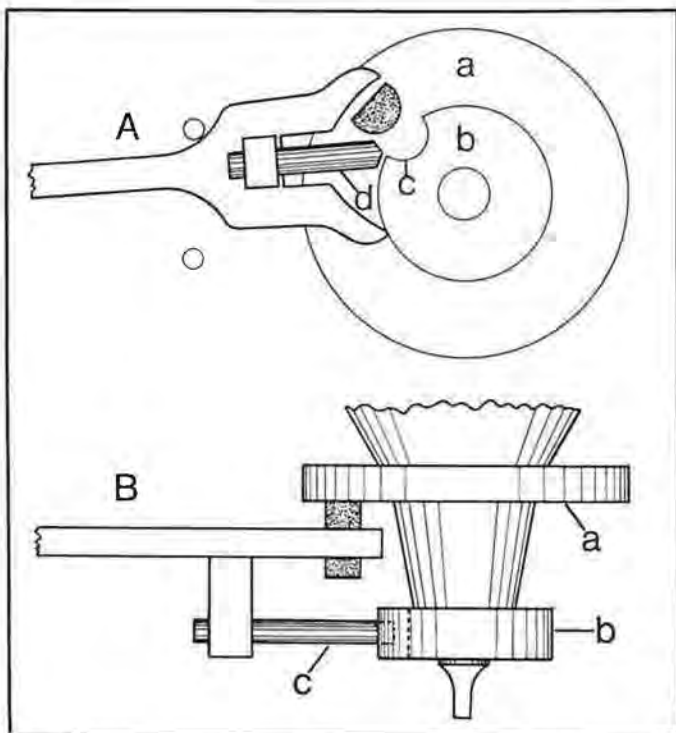


Figure 4

Figure 5 illustrates the difference between the safety action on the single roller and double roller escapements and also shows the relative amounts of safety on the guard pin for different diameter roller tables. Figure 5, View A shows a

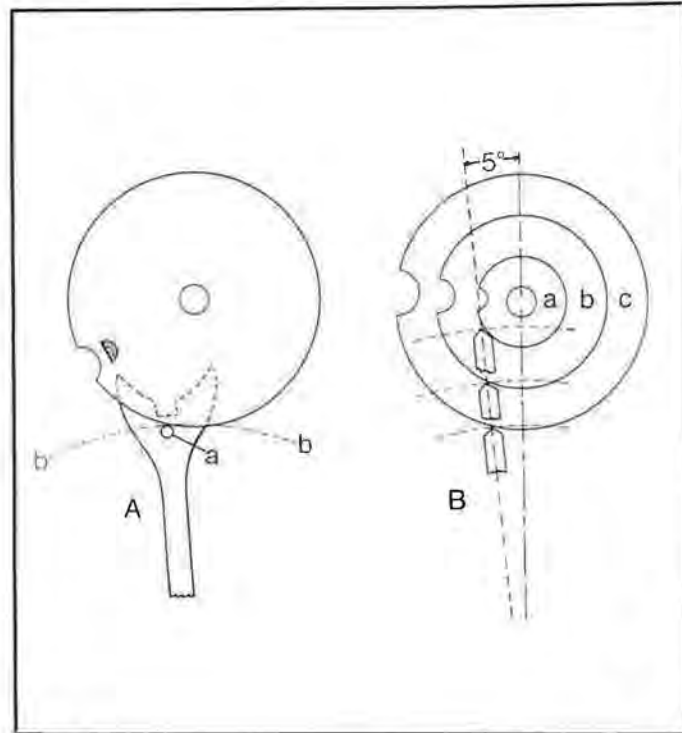


Figure 5

single roller escapement. Arc "b" shows the path of the guard pin "a." The margin of safety is shown where the arc crosses the edge of the roller table. This margin of safety is very small.

In other words, it would take very little pressure to cause the fork to go to the other side of the roller table, thus causing the escapement to go out of action. In this escapement, it is sometimes very difficult to adjust the guard pin freedom, especially if the balance staff pivots fit loosely in their jewel holes. When the guard pin is bent toward the roller table to keep the fork from going out of action, the guard pin will rub the edge of the table; when the pin is bent away from the table the slightest amount, the fork will go out of action. The reason the single roller escapement has such a small amount of safety action is because the roller table is so large. The larger the roller table, the smaller the margin of safety and the smaller the roller table, the greater the margin of safety.

To illustrate this point, please refer to View B of Figure 5. This view shows safety rollers of three different diameters. Also shown is a double roller guard pin in connection with these tables. Since the fork travels 5° on each side of the line of centers, these guard pins are centered on the 5° line to illustrate the margin of safety on each diameter table. The lines showing the arcs of the ends of each guard pin show the margin of safety. It will be noted that Table "c," the largest one, has the least margin of safety, and Table "a," the smallest one, has the greatest margin of safety.

To be continued next month.

TIMES

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PROFIT THROUGH PROFESSIONALISM

(Continued from page 43)

and anticipated profit to the repair department to which he adds the salary of the watchmaker.

Actually, we have been going through a reverse accounting or budgeting process to arrive at our shop rate. At the end of a year, we would be able to compute our actual costs and test the validity of our estimates. We would then add anticipated increases in cost for the coming year to arrive at a new shop rate. The cost of repair material was purposely eliminated from our calculations since we can assume that the replacement cost of all material used will be added to the repair without being individually itemized unless the cost is significant. Customarily, any costly part should be sold at about double its cost.

The efficiencies of a properly run trade shop or factory service center should be evident to all watchmakers who work at the retail level. We should constantly be aware of those efficiencies and try to employ them whenever possible in our retail operation. The trade shop

watchmaker is not involved in the selling process since all work that arrives at his bench has been pre-sold. He often is a specialist who works on a specific type or brand of watch and thus becomes a very proficient mechanic. He is not involved in the delivery of the watch to the customer. Many trade shops use less skilled labor to accomplish the cleaning and polishing of cases and the procurement of parts. All of these efficiencies result in the maximum use of the watchmaker's skill. Parts are procured in quantity, resulting in considerable savings. In the case of the factory service center, parts are supplied by the factory at the lowest possible price. After arriving at your own pricing structure using the method suggested in this article, you may feel you want to test your pricing for competitive reasons. You should compare your prices with those being charged by high quality trade shops and factory service centers, recognizing that their prices are wholesale and are supplemented by no less than 40% before delivery to the retail customer.

In the final analysis, the real test of pricing is the public's acceptance

or rejection of the price you place on your professional service. Recognize that the public may accept or reject your price based on the lack of professional salesmanship or the lack of a proper professional image as discussed in the two preceding articles. Recognize also that pricing may be rejected by the public as a result of inefficient use of the watchmaker's skill. The wasteful use of his time in the selling process, case cleaning, replacement of crystals and spring bars, and in the procurement of parts will result in an increase in the time required to perform the work and thereby unjustifiably increase the price.

If the use of this pricing technique results in a substantially higher price than you are now charging, and you are a bit reluctant to make an abrupt change, there is a simple way to test the public's reaction. Take every fifth customer and attempt to sell your professional service at the higher price. A good professional image and professional salesmanship will go a long way towards making your price acceptable, and good workmanship will keep it that way. You will never know until you try. 



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The joint promotion will be delivered in full color, 2-page spread ads in the Sunday supplements of nearly 500 newspapers nationally on November 2, 1980. Over 50 million households will receive mail-in cash refund certificates in this Sunday ad. Official mail-in cash refund certificates can also be obtained from "Eveready" point-of-sale display assortments.

Each of the 10 Mattel toys offered has a specific refund amount ranging from \$2.00 to \$4.00 available with proof of purchase of that toy and the appropriate "Eveready" No. 950, 935, or 216 batteries powering that toy. The more toys and batteries a consumer purchases, the larger his rebate.

Additionally, the consumer may receive one 50-cent rebate by purchasing four "Eveready" C or D size flashlight batteries or two "Eveready" 9-volt transistor batteries even if no toy is purchased.

See your "Eveready" representative for further details.

HARRIS NAMED CONSERVATOR AT NAWCC MUSEUM

J. Carter Harris has been appointed conservator of clocks

at the National Association of Watch and Clock Collectors Museum in Columbia, Lancaster County, Pennsylvania. Mr. Harris previously worked in the clock shop at Colonial Williamsburg and later served as an apprentice to John C. Losch, master clockmaker, of Holliston, Massachusetts. Mr. Harris received a BA in History at Keene State College, Keene, New Hampshire. He is currently preparing a manuscript for publication based on his compilation of eighteenth-century clock and watchmakers' advertisements appearing in American newspapers. In June of this year, the title of Fellow of the National Association of Watch and Clock Collectors was conferred on Mr. Harris for his contributions to the field of horology and the affairs of the Association.

TWO AMERICAN JEWELERS ON WAY TO SWITZERLAND

Congratulations to John Farnan of Farnan Jewelers of Wayne, Pennsylvania, and to James Clark of Clark's Jewelers in Wichita, Kansas who won the WOSIC and the Jewelry Industry Council scholarships. The drawing took place recently in New York.

The scholarship is the equivalent of half the cost of tuition to the CFH Institute Course in Lausanne, Switzerland. Two courses will be offered: the first is entitled "Product Knowledge and Salesmanship"; the second, "Store Management." The courses provide study programs with classes running all day, five days a week.

The CFH Institute was



Left to right: Jean P. Savary, President of WOSIC; Marie F. Bodman, responsible for CFH Institute program in the U.S.; Morton Sarett, President of JIC; Simon Swidler, attorney.

founded in Switzerland 16 years ago. Since that time, it has enrolled more than 30,000 jewelers from 80 countries. If you are interested in receiving more information, please write to The Watchmakers of Switzerland Information Center, Inc., 608 Fifth Avenue, New York, NY 10020.

APRIL 25 TO MAY 4, 1981: THE BASLE FAIR

Important! Mark your calendar now! These are the ten days during which the world's watch and jewelry trade is going to feast its eyes on the year's broadest most dazzling and complete display of watches, clocks, alarms, jewelry, and goldware, along with the widest range of items for making, marketing, displaying, repairing, and servicing them. This represents the complete production of an entire continent with a widely developed specialist industry in this area.

April 25 to May 4, 1981—the opening and closing dates of the ninth (already!) European

Watch, Clock and Jewelry Fair in Basle, Switzerland. Spread over 70,000 sq.m., 1,500 exhibitors representing 16 countries will be showing their spring collections—everything they make, not merely selected items culled for specific markets. At the European Watch, Clock and Jewelry Fair, the producers and manufacturers themselves do the honors—one of the Fair's most attractive (and practical) aspects.

Some 300,000 invitations to this important event will be leaving Basle in the coming days. They contain all the information a visitor to the Fair needs to know, along with an accommodations booking card—something which is wise to do long in advance. Your name is very likely to be on the mailing list already, especially if you have visited the Fair at least once in the past. But it's best to take no chances, so send a postcard today with just your name and address to: Basle Fair, CH-4021 Basle. This way you are sure to receive the information described above. And remember to keep these dates open: April 25 to May 4, 1981.

CONQUEST WATCH FOR WILLY MAYS

Willy Mays, one of America's star athletes, is presented with a "hi-tech" Conquest Watch by John L. Davis, President of the Longines-Wittnauer Watch Co. at the Retail Jewelers Association Show. The handsome timepiece, part of Longines' International Quartz Collection, was presented to Mr. Mays in recognition of his contribution to baseball. The Conquest No. 4842 with its two-tone styling—stainless steel with gilt accents—is available with white, gilt, and black dials and retails for \$595.00.



TWELVE COLORADO WATCHMAKERS CITED BY SEIKO

Seiko has awarded Certificates of Achievement to twelve Colorado watchmakers in recognition of their recent completion of an intensive technical work bench course on Seiko analog and digital quartz watches conducted by Seiko Time Corporation and Seiko's local regional distributor, Mimco.

The certificates were presented to: Howard H. Motoyama, David Morgan, Rodney E. Phillips, Elden O. Ramsel, Byron Scott Whetstone, Richard C. Sloan, Roy N. Nuckols, Lyle S. Evans, Karl R. Tanke, Jimmie H. Kunugi, Wayne H. Frey, and Donald W. Wirt.

NATION'S TOP EXECUTIVES SHUN TRADITIONAL WORK DAY

While most of the nation's work force is just showing up for work, chief executive officers of leading corporations have already completed their most productive time of day.

When it comes to productivity, CEO's eschew the normal 9 A.M.—5 P.M. workday, according to a survey by Omerga Watch Corporation, opting instead for the early-morning hours.

Forty-three percent of the survey participants, all leaders of major (Fortune 500) corporations, selected the pre-9 A.M. time period as their most productive time of day. Eighteen percent cited after-five as their most productive hours, while 3 percent chose the lunch hour. Only 36 percent prefer the normal business day, and morning (9 A.M.—noon) hours were favored three to one over the afternoon for these traditionalists.

The Omega survey also queried the nation's top executives on their watch-wearing habits and discovered that all of them wear a watch at the office. The overwhelming majority (83 percent) wear the same watch every day, even though 95 percent of the corporate leaders own more than one timepiece. One of the top executives, Robert E. Kirby, chairman of Westinghouse Electric Company, proudly reports a wardrobe of 10 watches.

Of those who specified the brand of watch they wear, the overwhelming majority (69 percent) displayed a preference for Swiss-made watches. Of these, Omega was the most popular brand.

"The popularity of Swiss

watches in general and Omega in particular is certainly not surprising," says Robert N. Wiiken, president of Omega Watch Corporation, New York. "Leading business executives comprise a major cadre of faithful Omega wearers both in the United States and throughout the world."

LONGINES-WITTNAUER BREAKS FALL ADVERTISING CAMPAIGN

The Longines-Wittnauer Watch Co. announced it is expanding its fall print, TV, and radio campaign.

"The Longines, 'I was hoping for a Longines' ad, and the Wittnauer, 'I want a Wittnauer' ad have proved so successful with both the consumer and the retail jeweler that we are expanding these campaigns starting in October," said Max Beschloss, Director of Advertising of the Longines-Wittnauer Watch Co.

He explained that the copy will emphasize the styling and technology in both the Longines and Wittnauer watches and the fact that they are Swiss.

Print ads will appear in general editorial magazines, sports

magazines, and the leading men's and women's fashion magazines. To tie in the local jeweler, the TV commercials will have tags indicating the names of the jewelers, and where Longines or Wittnauer watches can be purchased.

"The already established, 'I was hoping for a Longines' theme is designed to promote the Longines brand by reinforcing the watch's quality image," said Mr. Beschloss.

"By continuing, 'I want a Wittnauer,' we seek to reinforce the positioning of Wittnauer watches as timepieces with rich European styling at a downright American price."

CODRARO ELECTED TO AMERICAN WATCH ASSN. BOARD

Bertram S. Lowe, President of the American Watch Association, has announced the election to the AWA board of Lawrence F. Codraro, Vice-President, Corporate Secretary, and General Counsel of Bulova Watch Company, Inc.

Mr. Codraro holds degrees from Fordham College (BS, 1946), Fordham Law School (JD, 1950), and New York University Law School (LLM, 1961), and is a member of the Fordham and New York University Law School Alumni Associations, the New York State and Connecticut Bars, and the Westchester-Fairfield Corporate Counsel Association.

He is based at Bulova's headquarters of Bulova Park, Queens, New York, and resides with his family in Greenwich, Connecticut.



1980-81 OMEGAS

Hugh Glenn (right), vice-president of sales for Omega Watch Corporation, reviews the new Omega styles with designer Hans Scholl. The new 1980-81 collection of Omega timepieces features an extensive selection of 14- and 18-karat gold and diamond watches for both men and women, as well as an expanded selection of quartz timepieces.



THERMATRON™ WATCH A BIG HIT

A demonstration unit of Bulova's Thermatron watch drew crowds of interested retailers at three fall jewelry shows. Bulova technicians were on hand to explain how the patented thermo-electric generator, invented by Bulova researchers in Switzerland, converts body temperature into electricity to power quartz watches indefinitely.

By means of a demonstration microammeter, connected by wires to a watch, jewelers could actually see the needle move as the watch was placed on the wrist, proving that the

accumulator in the quartz movement was being charged.

The Wall Street Journal, television, and broadcast media reported the technological breakthrough by Bulova. In inter-



THERMATRON™ WATCH by BULOVA



views with the press, Andrew H. Tisch, Bulova President, indicated that plans called for introduction of the new watch in the spring of 1981 with an approximate retail price of \$500.00. **TIMES**

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hydrogen, propane, natural gas or Mapp. It's available with five tips ranging in size from one large enough to weld 16 ga. steel to one small enough to weld .002" copper wire. For free brochure write to:



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- ☐ Please send free Findings Booklet.
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ELEVENTH RAILROAD APPROVES BULOVA ACCUTRON QUARTZ WATCHES

The Atchison, Topeka and Santa Fe Railway recently added its name to the list of railroads that have approved Bulova Accutron Quartz Railroad models for their operating personnel this year.

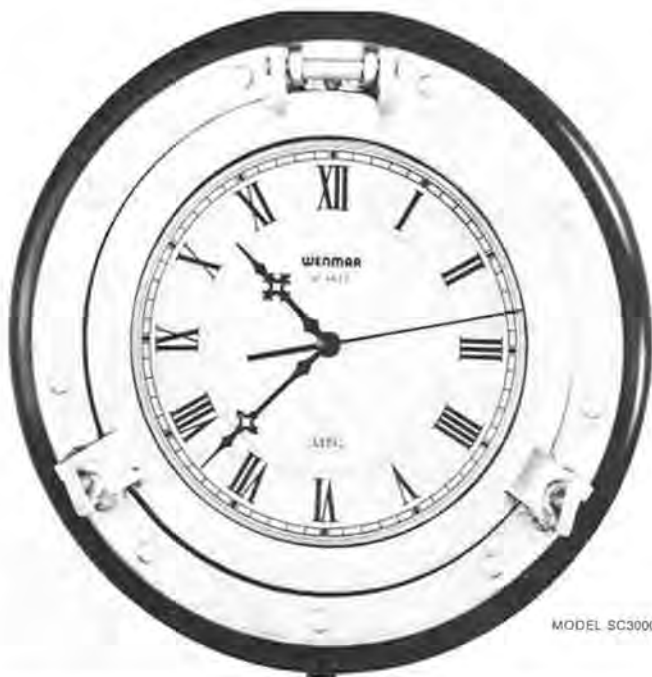
The other railroads who tested the Bulova quartz watches to their meticulous standards and approved them are: Missouri-Kansas-Texas; Union Pacific; Norfolk and Western; Chicago, Milwaukee, St. Paul and Pacific; Chesapeake and Ohio; Baltimore and Ohio; Seaboard Coast Line; Louisville and Nashville; Southern Pacific; Denver and Rio Grande Western.

Illustrated is model 92518 in a yellow goldtone case with stainless steel back, special "Railroad" dial, day and date, with a yellow goldtone bracelet. It has a suggested retail price of \$175. Model 91507, which is the same in all steel, has a suggested retail price of \$140.

AITG INC. EXCLUSIVELY IMPORTING RARE NAUTICAL CLOCKS

American Intercontinental Trade Group, Inc., of Woodland Hills, California, has announced an exclusive pact to import Wenmar/AITG nautical clocks. The announcement was made by Murray L. Dorfman, President of AITG.

The 17th-century Spanish galleon porthole replicas feature a fine quartz movement, Indonesian Ramin wood trim in a walnut finish, heavy solid brass fittings, Roman numeral face with an aluminum face plate, by-the-second sweep hand, accessible time adjustment lever (to allow setting without removing the timepiece from its mounting) and, because of their timeless design,



will fit any decor. Better known as ships' clocks, these distinctive nautical 12½" by 12½" timepieces weigh ten pounds, keep accurate time for over a year on a single 1.5 volt alkaline battery, feature a built-in wall hanger, and include a year's full warranty.

In making the announcement, Murray L. Dorfman added, "These Wenmar/AITG nautical ships' clocks are in great demand because of their excellent quality, top performance features, beauty of design, and attractive pricing." Those wishing further information should contact American

Intercontinental Trade Group, Inc. at Warner Center Business Park, 21250 Califa St., Suite 109, Woodland Hills, CA 91367. In the U.S., phone 213-703-0600; cable AMERINTL; Telex 69-8643 AMERINTL WDHL.

GEM INSTRUMENT'S COLORMASTER CLUB

Gem Instruments Corporation has formed the ColorMaster Club. This club will provide ColorMaster owners with latest information, new developments, and suggested techniques for using the instrument in the rapidly changing colored stone market.

The introduction of the ColorMaster has brought an exciting breakthrough in grading, appraising, buying, selling, and matching colored gemstones. New owners of the instrument report that it is the ideal way to communicate the color appearance of gemstones among suppliers and customers. It provides a repository for an unlimited number of master stones using the instrument notations.

A list of all ColorMaster owners is provided to club members to encourage the exchange of information and to expedite stone orders among members.

For complete information write Gem Instruments Corporation, P.O. Box 2147, Santa Monica, CA 90406.



THREE NEW, SLIM, QUARTZ TRAVEL ALARMS FROM SEIKO

For easy journeying or bedside convenience, nothing beats these slim, magnificently styled Seiko quartz alarm clocks. Octagonal tortoise finish case and Roman numerals highlight the accurate and dependable model at the far left. The classic look of bold Roman numerals circling a luxurious gilt chapter ring and round oyster white enamel case distinctively punctuate the clock at center. The model with bold Arabic numerals (right) features a lustrous black enamel-finish octagonal case that opens to reveal a white dial. Each model features a convenient five-minute repeat alarm. The cases of these slim timepieces simply snap shut to pack for easy traveling. All three have suggested retail prices of \$50.



TWO NEW VIGOR ENGRAVING MACHINES

We are pleased to announce the addition of two new Super Model Engraving Machines to the line of Vigor Engraving Equipment. These two models are EN 11500—Standard, and EN 11000—Motorized. Both have a multi-ratio tracing arm, accommodating 17 different letter sizes, adjustable from 2:1 to 6:1. The jaws will hold most jewelry items, gift items, mugs, etc. This equipment is beautifully made and will please the most sophisticated engraver. B. Jadow and Sons will be very pleased to send anyone writing to the address below, the complete set of operating manuals so as to provide the complete information and specifications about these

new units to prospective customers.

Units are available for immediate delivery. Distribution is to regular wholesale watchmakers, jewelers, and lapidary supply houses.

Write to B. Jadow and Sons Inc., 53 West 23rd St., New York, NY 10010, should you wish to receive a free copy of the specification manual.

NEW FROM ALTHOR: "SHOWCASE" AND "SHOWOFF"

Two new containers from Althor Products will serve a multitude of purposes. The invertible black closure of the "Showcase" box enables it to be used for display or as a container. It comes in six sizes up to 5 5/16" high. The deeper-lidded "Showoff" is available in eleven sizes up to 7 1/4" high. Priced from 15 cents to two dollars, descriptive literature and price list are available from Althor, 496 Danbury Road, Wilton, Connecticut 06897.



MISS U.S.A. ADMIRES BULOVA'S NEW PEARL WATCHES

Jineane Ford of Arizona, the 1980 Miss U.S.A., loves the dressy new ladies quartz watches in Bulova's fall collection. One of a group of three watches ornamented with pearls and cubic zirconia, this particular design incorporates eight cultured pearls and has a full flow mesh bracelet. Pearl jewelry is making a



strong showing this fall and Bulova's new watches give jewelers a perfect opportunity for tie-in sales. Suggested retail price for style 92020 is \$325. For further information contact National Sales Manager, Bulova Watch Company, Inc., Bulova Park, Flushing, NY 11370.



3,000 DWT. GOLD CAPACITY MELTING FURNACE FROM SWEST

Swest, Inc. introduces the new Rey Gas & Air Melting Furnace for melting large quantities of gold, silver, brass, aluminum, etc. Equipped with a blower and mixer for a high temperature gas and air

flame and a control unit to regulate air flow, the unit has a capacity of 3,000 dwts. of 14K gold, 145 oz. of silver, or 8.5 pounds of red brass. Also supplied with the furnace are 3 crucibles, 2 crucible bases, and a unique easy lighting device.

"A special feature of this furnace," says Earl R. Weaver, president of Swest, Inc., "is our easy lighting device which assists in the sometimes difficult and dangerous lighting process. Similar furnaces have no easy method of starting the flame."

A free brochure listing the furnace, related melting accessories, and prices is available by requesting the Rey Melting Furnace brochure from Swest, Inc., 10803 Composite Drive, Dallas, TX 75220, or 1725 Victory Boulevard, Glendale, CA 91201.



BULOVA OFFERS CLOCK SALES TRAINING IN NEW BOOKLET

A unique, 20-page brochure entitled "The Bulova Clock 'Instant Expert' Sales Course" has been produced by Bulova. In just three months, 15,000 copies have been ordered by retailers for their sales personnel.

The booklet explains the terminology used in describing clock features. It covers the three basic types of movements, and even gives particulars on maritime clocks. Alarm clocks rate a separate chapter, as do mantel and wall clocks.

To obtain free copies of the "Instant Expert" brochure, retailers should address themselves to their Bulova salesman.



NEW "FERRARI" FROM LONGINES-WITNAUER

The Longines-Wittnauer Watch Co. is official timer of the Ferrari Formula One Racing Team. The

watch company has just introduced their own "Ferrari," this sleek new quartz timepiece with

a two-tone bezel and bracelet. The stick dial, available in either brushed gilt or black enamel,

has a calendar and is covered by a sapphire crystal. The suggested retail price is \$795.



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ELECTRONIC WATCH REPAIR SPECIALIST Digital (LED & LCD) and Analog. Tuxedo Electric-Quartz Watch Repair Div., P.O. Box 561, Tuxedo, NY 10987. (914) 351-2282.

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WATCH REPAIR INSTRUCTOR North Bennet Street Industrial School, Boston, needs an individual by January 1, 1981 to teach all phases of watch repair, including mechanical and quartz watches. The school seeks candidates with combined skills and experience in watch and clock repair and/or jewelry making and repair for other instructional responsibilities in the future. Individuals with skills in watch and one or both of the other areas encouraged to apply. Class hours 8-3 daily. Medical and retirement benefits. Send resume to Walt McDonald, North Bennet Street Industrial School, 39 North Bennet Street, Boston, MA 02113. An equal opportunity employer.

Wanted To Buy

STERLING FLATWARE STOCKS—New or used needed. Call us before you sell for scrap. Also wanted: silver, diamonds, gold scrap, coins and coin collections. Call or write: Mr. Neff, HT, WFN Enterprises, 2300 Henderson Mill Rd., N.E. Suite 318, Atlanta, GA 30345. Phone: 404/938-0744.

Wanted to buy: 4-jar Peerless automatic self-reversing cleaning machine in good condition—with cleaning baskets—will pay premium price. Jack Zaverl, 3333 Dale Rd., Zanesville, Ohio 43701. 614/453-4690.

IMMEDIATE CASH PAID for Gold, Silver, Platinum, any form! Jewelry scrap, filings, gold filled, sterling! Immediate top dollar cash offer return mail! Satisfaction guaranteed. Ship insured/registered mail to: American Metals Co., St. Andrews Branch, P.O. Box 30009H, Charleston, SC 29407.

Situations Wanted

Scandinavian watchmaker, 42, highly qualified in finer watches, French clocks, chronographs, etc., seeks position on West Coast, preferably California. For information contact Svend Brauner, 11 W. Anapamu St., Santa Barbara, CA 93101.

WATCH AND CLOCK MENDER, C.C., C.E.W.S.
I need a Master willing to help serious apprentice. I presently own and operate watch and clock sales and service retail store. I am a 3rd generation horologist and have been at the bench for 13 years. My father and tutor has passed on and I am eager to continue with watch and clock making and restoration. I have good stock of tools and machinery and am willing to make firm commitment to educate myself. I will relocate or stay in Pueblo. Age 28. Contact Horological Times, Dept. SW109, P.O. Box 11011, Cincinnati, OH 45211.

For Sale

Pocket watches for sale; gold, silver, high-grade Europeans, railroads, hunters, etc. Send SASE for free list. Dealers prices available. Will trade repair service for your non-running pocket watches. P.M. Time Service, 7651 Lowell Blvd., Box 8, Westminster, CO 80030.

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New Hermes Engraver G. M. Model—like new—lots of extras. Reply: Terry Renberger, 418 S. Chestnut, McPherson, KS 67460. (316) 241-1106 after 7:00 P.M.

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For Sale—Timing Machines, Watchmaster Timers, Vibrograf Timers. Factory rebuilt. All machines guaranteed. Terms available. Also available Ultrasonic Watch Cleaning Machines. Write Vibrograf sales representative Robert Swensgard, 2630—A Jett Hill Road, New Richmond Ohio 45157. Or phone (513) 553-2113. Territory: Southern Indiana, Kentucky, Michigan, Ohio, Tennessee, and West Virginia.

ESEMBL-O-GRAF LIBRARY in 28 volumes, Pittsburgh, 1955. Chronograph repairing is made easy by step-by-step procedure. Each small step of removing and replacing each part and making adjustments is clearly illustrated. No concentrated study is necessary. Write EOG, P.O. Box 11011, Cincinnati, Ohio 45211.

Miscellaneous

Digital Watch Service Training. Zantech, Inc. offers training and instruments for servicing all types of digital watches. Course includes diagnosis of watch malfunctions and repair methods, including techniques in wire bond repairs using silver epoxy. Louis A. Zantoni, Zantech, Inc., 77 Shady Lane, Trenton, NJ 08619. (609) 586-5088.

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Since the passing of Jess Coleman, many have felt the void created by not being able to write or call Coleman for help. The unique 9 page index and cross reference prepared by Orville R. Hagans, once again makes it possible to consult with Coleman on almost any question relating to horology.

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Dates to Remember

NOVEMBER

- 2—New York Consolidated Jewelers Association of Greater New York Annual Meeting; Sheraton Centre, New York, NY
- 3—Watchmakers Association of New Jersey, 41st Annual Dinner Dance; Hawaiian Palms; Lyndhurst, NJ
- 10-21—GIA Evening Diamond Grading Course; New York, NY
- 21-23—Antique & International Jewelry Bazaar; Sarasota Exhibition Hall, Sarasota, FL

DECEMBER

- 2-24—Karat Club of New York Annual Membership Luncheon Meeting; Waldorf Astoria, New York, NY

JANUARY

- 4-6—Miami Beach Gift & Jewelry Shos; Miami Beach Convention Center, Miami, FL
- 18-20—St. Louis Gift & Jewelry Show; St. Louis Alfonso Cervantes Convention Center, St. Louis, MO
- 25-27—Houston Housewares, Gift, Jewelry & General Merchandise Show, Albert Thomas Convention Hall, Houston, TX

FEBRUARY

- 7-15—Tucson 1981 Spring Gem and Jewelry Show; Marriott Hotel, Tucson, AZ
- 13-17—The Independent Jewelers Organization Spring 1981 Seminar/Buying Group; New Orleans Marriott, New Orleans, LA
- 14-17—Inhorgenta 81 International Trade Fair; Munich, West Germany
- 28-March 2—Spring Pacific Jewelry Show; Hyatt Regency Embarcadero Hotel, San Francisco, CA

Advertisers' Index

AWI.	51,52,61,63
AMERICAN PERFIT CORP.	40
B.B. CRYSTAL CO.	40
J. BOREL GROUP	15
BOWMAN TECHNICAL SCHOOL	54
JOSEPH BULOVA SCHOOL OF WATCHMAKING	36
BULOVA MATERIALS	10,11
CAS-KER CO	Inside Front Cover,61
CITIZEN WATCH CO	Outside Back Cover
C. DVORKIN AND CO	45
EMPIRE CLOCK CO.	37
ESSLINGER & CO	3,58
GEM CITY COLLEGE	58
THE GOULD CO	27
B. JADOW & SONS, INC	50
JEWELMONT	23
KANSAS CITY SCHOOL OF WATCHMAKING	58
KIENZLE	31
KILB & CO	51
LANGERT.	53
S. LAROSE, INC	36
MARSHALL-SWARTCHILD CO	32,33
MAXELL CORP. OF AMERICA.	19,20,22
MEDIA DIGITAL CORP.	49
MIDO-BOREL.	26
NB SALES CO	44,46
THE NEST CO	30
NEWARK CO	22
PARIS JUNIOR COLLEGE	53
PORTESCAP U.S.	5
PRECISION INSTRUMENT.	45
PRESTIGE PREMIUMS	52
PRIMROSE-SONNTAG	20
PRO-CRAFT	21
SEIKO TIME CORP	Inside Back Cover
STANLEY DONAHUE CO. OF HOUSTON, INC	48
SWEST INC	54
E. & J. SWIGART CO	4
SWISS WATCH PARTS DIST. INC.	55
TWIN CITY WATCH SUPPLY CO	46
MARION WAHL	55
WATCHES UNLIMITED.	47
I. WIDESS & SONS.	49
YOUNG, NEAL CO., INC	41
ZANTECH INC	9

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