



## THE SANTA BARBARA COURTHOUSE TOWER CLOCK RESTORATION UPDATE

by Ernie Jenson

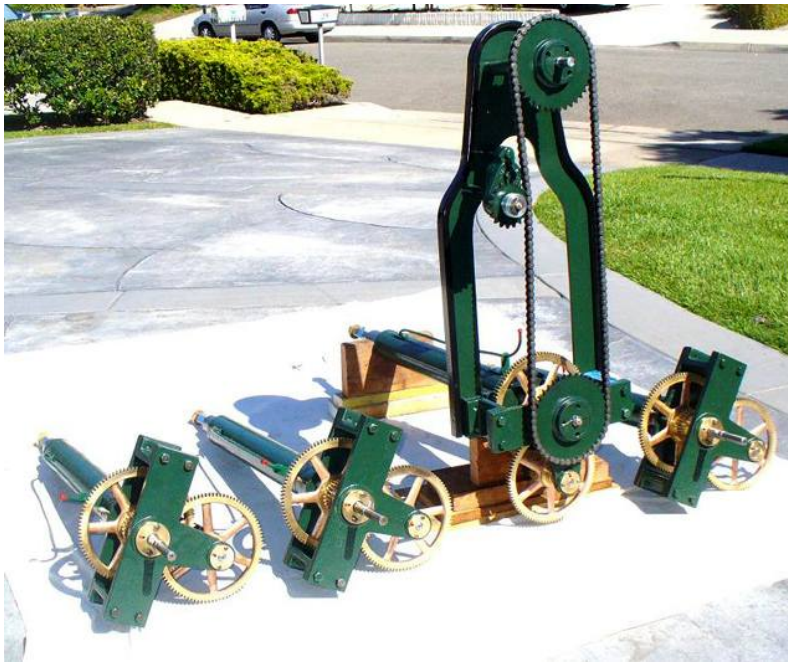
This update concerns the four motion works assemblies from each of the clocks dials. All four of the motion works for the tower clock at the Santa Barbara Court House have been completely restored and are ready to be returned to their lofty positions. The motion works are mounted in the East, South, West, & North tower walls. Ends of the motion works extend through the walls and have the hour and minute hands attached.

The clock was installed in 1929 and it appears that the motion works have been the primary maintenance problem for the clock over the years. The South facing motion works shows the most deterioration and quite a bit of damage from previous repairs. The South face of the building has probably received the worst of the ocean's salty sea breeze.

### Lubrication Problems

Eighty years is a long time to expect such a complex mechanical device to operate without major repairs, but this clock is one of the most rugged mechanical devices that I have ever worked on and is certainly designed to last for hundreds of years. The clock is a Seth Thomas Model 18 and is reported to be one of the biggest and the best in North America. I believe the motion works would have run, without failure, for their entire eighty years of existence if, but for a couple of design flaws regarding lubrication.

Failure has resulted in the outer two bearings of the motion works due to lack of lubrication. The outer bearings are on that part of the shaft that extends through the wall for the minute hand and the hour hand. These bearings are somewhat exposed to the elements due to their outside location. The design is such that these bearings are too far from the point of introducing the lubricant and the lubrication method was not reliable. The shafts are nearly four feet long and the bearings have to be lubricated from the inside of the tower, through tubes that are about three feet from the bearings.



The hour tube gets its lubrication from an 1/8" copper tube that runs along the top of the housing, through the wall, and is inserted into the housing at the location of the bearing. This tube was not anchored in any manor, it is just pushed into a small hole in the housing. The tube could easily become dislodged, depriving the hour hand end bearing of all its lubrication.

This was a serious problem but probably not the worst. The minute hand's roller bearings got their lubrication from a hole drilled through the minute shaft, like a rifle barrel. The shaft had an oil cap on one end and delivered oil through a small hole to the bearing at the other end, nearly

three feet away. The shaft rotates and sometimes the oil cap would be pointing down and if the shaft was not exactly level, the oil had to run uphill for nearly three feet. In nearly all cases, the minute hand roller bearings were running without any signs of lubrication. One would have to be very aggressive with the oil can to get any lubrication to these bearings. The oil can needed to be a pump device that could develop a suitable amount of pressure. The maintenance person would also have to understand that he was delivering oil to a

bearing three feet away and needed many pumps to fill the tube. Then, he would have to deal with the oil dripping out on the floor as the shaft turned upon the completion of the lubrication procedure. Not a good way to go.

### Solutions to Lubrication Problems

It was obvious that an improvement was needed to solve these two problems. The solution for the hour hand bearing problem was to install two small brackets on the housing to eliminate any possibility of the 1/8" tubing coming dislodged or being positioned incorrectly.

The solution to getting lubrication to the minute hand bearing was to remove the oil cap and install a grease fitting. Now, the shaft could be filled with grease and one or two pumps from a grease gun would lubricate that bearing for an entire year or probably a lot longer. A light weight molly grease was selected due to its low coefficient of friction.

*Continued on page 3*

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## PRESIDENTS MESSAGE

By Mike Schmidt

The Santa Barbara Courthouse Tower Clock project is going forward. Under the leadership of Mostyn Gale, clock restoration is moving along at a very steady pace. The old clock has been slowly giving up its previous repair history as the work progresses. We are all amazed at the durability that the Seth Thomas Clock Co. built into this three train clock. Our skilled Chapter members have completed about a third of the clock restoration. Thanks to the many who have given freely of their time and knowledge. Interested Chapter members are invited to come work for a day or a few hours. Members from Ventura County area are car pooling on prescheduled days. If you wish to be part of the tower clock restoration project contact Mostyn Gale: email: saving\_time@verizon.net



Our program for this month is of special interest for all who like old cars and clocks. Ray Brown is presenting "A History of Electric Clocks for the American Automobile". Ray is currently president of Chapter 133 "Western Electric" and is the chairman of the NAWCC Greater Los Angeles Regional. He is also on the board of Chapter 69, Orange County, and is editor of the newsletter "Tic Talk Times".

Our show and tell, after the program, has been terrific all year. Thanks to all who have shared. Please keep bringing the horological goodies.

See you at the Meeting *Mike*

## Happy Birthday

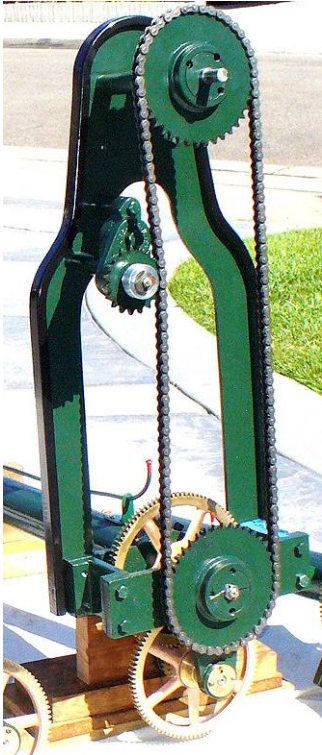
John Berney, Jim Chamberlain,  
Bill Frank, Royce Halsey,  
and Ken McWilliams



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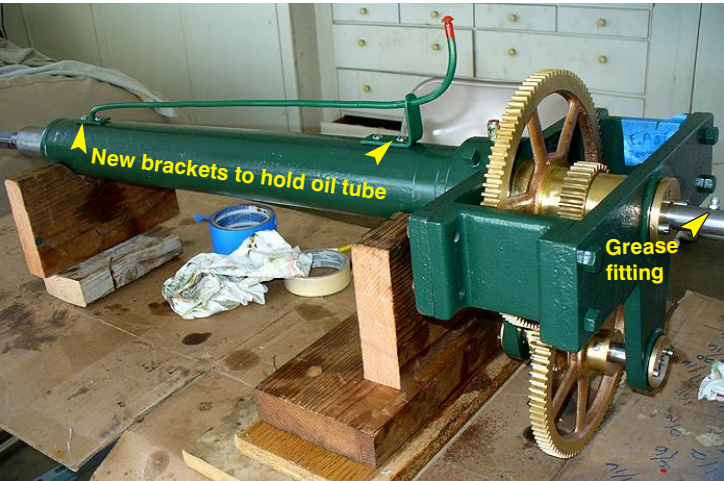
**Power Transmission**

The drive rod from the clock to the East facing motion works passed over the stairway to the tower’s observation deck. There will be a lot of traffic up and down the stairway due to the new clock museum. For safety, and to eliminate anyone disturbing the clock, it was determined that a device was needed to raise the rod several feet higher, away from the heads of tall people and from children wanting to do a chin-up on the clock rod.



A transmission was designed to accept the power from the clock rod and deliver it to the motion works below. This device was designed with a style appropriate to match the clock and to be as friction-free as possible. It has now been designed, built and successfully tested.

The transmission does not add any significant amount of drag to the motion works. A roller chain drive is very efficient. When the motion works is installed with the power transmission attached, a brace will be added to the rear of the frame and attached to the wall.



**Tasks that have been accomplished are:**

1. Install new roller bearings in all minute hand shafts.
2. Cut and replace one third of the South minute hand shaft due to serious damage by previous repairmen.
3. Clean and polish all shafts.
4. Paint the motion works due to heavily damage paint
5. Clean and polish all gears.
6. Install brackets to securely retain hour hand shaft's oil tube.
7. Install grease fittings to deliver lubrication to minute hand roller bearings.
8. Install felt grease seals and o-ring seals in the shaft ends located outside the building.

9. Design and build the power transmission device to be positioned over the stairway.
10. When making the new shaft for the heavily damaged South motion works, it was modified to be used for the added power transmission device in the East position. The East shaft was then used for the South motion works.
11. Run-in all motion works with a 200 rpm electric drill for the equivalent of a year's running, and take data to establish the before and after torque measurements.

*Before and after torque measurements*

	Before	After*
East	Failed bearing	36 oz. inches***
South	360 oz. inches**	36 oz. inches
West	84 oz. inches	30 oz. inches
North	48 oz. inches	30 oz. inches

\* All “After” torque results include felt rope seal and o-ring seal.

\*\*South was running with a dry hour bearing, badly bent shaft, and had been modified with a bushing to replace the roller bearings in the minute shaft that failed years ago

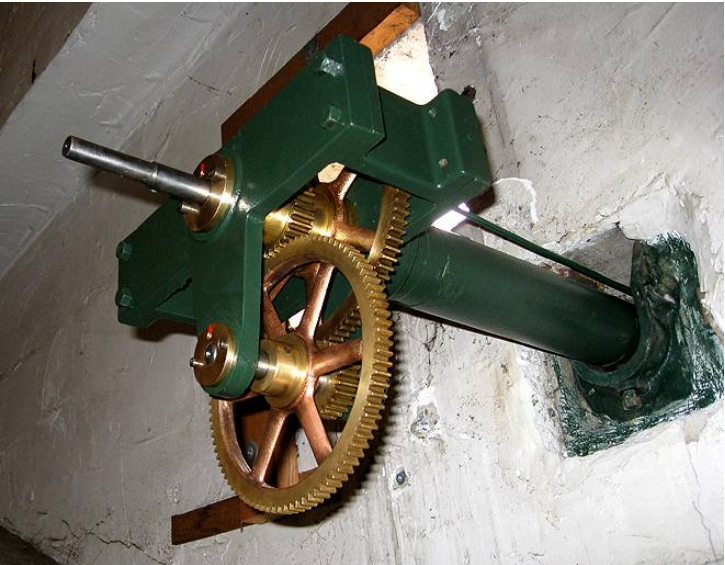
\*\*\* “After” torque measurements are with the power transmission attached.

My thanks to those who helped with this task: George Antinarelli, Chris Windle, Mike Schmidt, and David Johnson ■

**Here’s an update to the update.**

On Saturday morning, August 7th, Mostyn Gale, Ernie Jenson, Mike Schmidt, George Antinarelli, Jim Chamberlain and Ken McWilliams met at the Santa Barbara Courthouse to install the newly refurbished motion works and clock hands.

The installation went almost flawlessly and by about one thirty, all four clock faces had their motion works and hands back in place.



# THE AGE OF THE QUARTZ WRISTWATCH

by Henri Bonnet

For better or for worse, the age of the quartz wristwatch is here. Quartz timepieces aren't exactly new. They have actually been around for more than forty years, and can now be found on the wrist of over seventy percent of the world's population. In 1967, a consortium of Swiss watch manufacturers revealed their first quartz wristwatch (the Beta 21), and almost simultaneously, the Japanese company, Seiko, announced its own quartz timepiece, (the Quartz Astron).

What are quartz wristwatches? How do they work, and why are they so accurate? Why are they relatively inexpensive, as compared to quality mechanical timepieces? What are their advantages and shortcomings? Why are they called quartz wristwatches in the first place?

Some answers to these, and other pertinent questions concerning these timepieces follow: obviously all quartz wristwatches are electronic devices. Quartz is the name of a mineral abundantly found in nature, also known as silicon dioxide. Quartz exhibits some nearly miraculous properties, first discovered at the end of the nineteenth century in France by the Curie brothers. The property of interest to us here is called the piezoelectric effect. Under certain conditions, a quartz crystal, subjected to an electric field, vibrates at a known frequency of about 32 kilohertz, and by so doing generates a positive and negative electric field on its surface, at that very same frequency.

How are quartz wristwatches constructed? In a nutshell, a typical quartz timepiece comprises a minimum of 5 distinct parts: 1. A power source. 2. A frequency generator. 3. A frequency divider. 4. A microprocessor. 5. A display.

The power source is usually a small electric cell, (battery). Alternate power sources could be a small solar panel integrated within the watch dial, or a micro-generator driven by a rotor, similar to the rotor in an automatic mechanical wristwatch. In the later case, the micro generator or solar panel usually charges a small capacitor which stores the electrical energy. The frequency generator is the quartz crystal itself which is a component of the oscillator circuit, and as such, gives its name to the wristwatch. The computer in a microchip integrates the frequency divider together with its logic circuit.

The display can be either analog, digital, or both. The quartz crystal, nowadays, is synthetically produced to insure purity and consistency. The crystal itself is laser cut and could be, bar, lenticular, or tuning fork shaped such as in modern timepieces. The tiny quartz tuning fork resonator is encased within a small cylindrical container, in a vacuum. When connected to a power source, the two branches of the quartz tuning fork vibrate in opposite directions, thereby generating a small electric field at a precisely tuned frequency of 32,768 hertz. This particular frequency is very important, since it is

conveniently compatible with the binary logic of the frequency divider. A frequency of 32,768 hertz may also be mathematically expressed as 2 to the power of 15. So, all the frequency divider has to do is divide 32,768 by 2, 15 consecutive times, to arrive at number 1, which represents one second. It is obviously much faster than counting 32,768 electric pulses to arrive at the same answer. It also consumes less energy.

Once energized, the quartz crystal requires very little additional power to retain its vibrating state, hence the typical low electrical consumption of quartz timepieces. A regular quartz wristwatch, can easily remain powered by the same battery, for 3 years and beyond. (*See continuation of this article in subsequent part 2*).

Below see pictures of several early quartz wristwatches, mostly from the nineteen seventies and eighties.



**Left:** The famous Movado Museum Watch. The dial design patented in 1958 by Nathan Horwitt **Right:** An early Elgin Quartz dress watch in stainless steel. The movement is Japanese.



**Left:** An Omega Seamaster quartz ladies wristwatch with calendar in stainless steel.

**Right:** A Hamilton watch with a complicated Swiss quartz movement and a complete calendar.



**Left:** A Yungchans Solar 1. German-made with a solar panel in the dial, charging a capacitor.

**Right:** A Rado Diastar with date. The case is made of a tungsten alloy to make it scratch-proof.

# Tales From the Bench

by Ferdinand Geitner

## Some Surprises Can Be Good

The customer is always right and one tries to accommodate (almost) every wish. Harrods of London prides itself in it's moto that it can get a customer anything they desire (at a price of course!) But, some customer requests can challenge one's ingenuity.

An Austrian Parlor Clock was saved from the fires that ravaged Santa Barbara, but the case was damaged and the pendulum got lost in the process. The case is wood, with alabaster columns and delicate brass decorations. The customer gave a pretty good description of the pendulum but, where can one obtain a fancy, "super light" pendulum matching the style and mechanical requirements? There was nothing to be found in the catalogs or on auction sites.

After scouring bead and custom jewelry shops for some thin filigree discs, I thought that I had hit the jackpot when I found a set of earrings that looked possible. Very thin, light, fancy, pierced, with a pressed pattern about 1 1/4 inches in diameter.

But, after attaching a pendulum rod and testing the clock it was just a little to short when it was keeping time. To be visually attractive, it needed to be 3 inches longer so I had to find an even lighter piece.

My next brainwave was "make one"!!! There are quite a few fancy Pendulum bobs available in Brass for French and American clocks but they are much too heavy. So, I decided to take one of these bobs, heat it to almost glowing, and impress the pattern into a hard piece of plastic. Don't try this at home as it is "very dangerous". Too hot and you set the plastic on fire, not hot enough and you don't make much of an impression in the plastic.

After making a matching opposite impression, you have a pattern and can take a paper thin sheet of brass, place it between your pendulum and the form you created, place it and align it carefully, push together and hammer the pattern onto it (cold forming).

Now, you should have a very thin, light, fancy disc that will work as a pendulum bob. One can always add weight behind it if necessary.

To continue on the story of my quest, as I heated the brass pendulum bob to make my impression, lo and behold, liquid metal began to pour out of the pendulum!

As it turned out, the pendulum was a paper thin shell filled with lead. It was exactly what I needed. I now had my fancy, paper thin pendulum bob.



Sometimes you win in the most unexpected ways. ■

**The next Meeting & Mart for Chapter 190  
is August 15, 2010**

**Sellers may start setting up at 11:30**

**The Mart is open from 12:00 til 1:15**

**The Meeting starts at 1:15**

### **PROGRAM**

**"A History of Electric Clocks  
for the American Automobile"**

**Presented by Ray Brown**

**This is a very interesting program and  
one that you aren't likely to see anywhere else.**

### **SHOW & TELL**

**"Car clocks or any others items you want to share"**

## **EDUCATIONAL OPPORTUNITIES**

The following are courses that may be offered to those who are interested and have the required prerequisite.

FSW- Nov. 2010 "Introduction to Wrist Watch Repair"

### **For the year 2011**

FSW- 102 "Time & Strike Clocks with Spring Barrels"

FSW- 200 "Fundamental Skills for Lathe & Clock Repair Course Part I"

FSW- 201 "Fundamental Skills for Lathe & Clock Repair Course Part II"

FSW- 202 "Lathe II Clock Repair Course"

FSW- 103 "Introduction to Chime Clocks"

FSW- 104 "Introduction to Weight and Fusee Driven Clocks"

## CHAPTER 190 PEOPLE

by Kris Clarkin

### Larry and Geri Smith



I contacted the Smiths around 5:30 on a Tuesday afternoon to start gathering information for this profile. Larry was out of the house attending a clock class. Geri was at home and was free to talk to me. And talk we did. What a delight she is, completely charming. Odds are this is not an unusual snapshot of the Smiths. They are two of the most charismatic people around.

Both Larry and Geri are members of the NAWCC, in a big way. They joined in 2004 and attended meetings together at three different chapters; 190 of Ventura, 116 of Santa Anita, and 75 of the San Fernando Valley. Geri basically attends the meetings to accompany Larry, the true clock and watch aficionado. Geri also helps out with lunch at the meetings and is more than willing to take over any needed task. (She's the one helping out with a big smile on her face).

They met as teenagers. Larry and Geri attended the same Baptist church where Larry's father ministered. As they say, the rest is history. They have now been married for fifty-two years. Larry spent most of his professional life working construction in Nebraska and Colorado. They have three grown sons, ten grandchildren, and seven great grandchildren. Unfortunately, none of their kids live close by. They reside in Texas, Nebraska, and Colorado.

Along the way, they shared their lives with a couple of Saint Bernard's "which are only good for loving", according to Geri, and more recently, an English Spaniel, named Beauty, which they unfortunately had to put down recently.

Larry bought his first clock in 1961 at a "junk store" run by an elderly Jewish man. It was an old kitchen clock that didn't work. Sometime in the 1980's, a repair was attempted but, to no avail. It wasn't until years later that Larry was able to finally fix it himself. Around 1966 or 1967, Larry acquired a "simple old school clock" from 1929 that was gifted to him after he repaired some water lines for a client. To this day, it is still one of his favorite clocks.

Larry lost his father fifteen years ago which prompted the Smiths move from Colorado to Montebello, California to be closer to his mother; who is now ninety-four years old.

Although it took some time to get used to living in Southern California, they immediately adored the warm weather. While they miss the kids, they do not miss the snow.

Once in Montebello, Larry became the building supervisor for a 130 unit seniors apartment complex. With the spare time this position afforded him, he started to take clock classes. In spite of being married for over half a century, it wasn't until Larry's first clock class that it became crystal clear, even to Geri, just how much he adores both clocks and watches. He has now taken every NAWCC Field Suitcase class offered. He also enjoyed taking clock classes at Wilson High School in Montebello for Adult Education from Bob Diltz. Bob ran a tight ship; twelve to eighteen students at a time, and it was all work, "no gabbing."

Larry's job requires him to be on the apartment site, so they live in the complex he supervises. Their unit is 550 square feet and they house fifty clocks in it! (Certain rules apply, no clocks in the bedroom and they must all hang on the wall.) All chime or are cuckoo clocks, with the ship's clocks having the strangest chime of all. For actually knowing what time it is, Geri relies on the one GPS- satellite clock that they own. Geri used to dust all of the clocks but found that they would then stop running. She is no longer supposed to sweep the floor either, but if she does she must save what is swept up for inspection should some crucial piece or part have ended up on the floor.

Larry is able to have a separate shop at the apartment complex which houses his work area, his tools, and his Sherline lathe.

Larry enjoys finding a deal on a pocket watch that needs to be fixed, yet he admits that at this point he has ruined more pocket watches than he's fixed. He works mostly on mantle clocks which he repairs for himself. He just finished fixing a banjo clock which "shouldn't be hidden." Geri was most grateful that Larry recently made a screw to repair her eyeglasses too.

They hope to attend the NAWCC Silver Dollar Regional in Reno /Sparks Nevada, August 14 and 15th (which is hosted by the NAWCC Sierra Nevada Chapter 65 and the Sacramento Valley Chapter 71), but have yet to resolve a scheduling conflict. ■

Welcome New Member

Bruce Mac Laughlin  
from Simi Valley



# CLASSIFIED PAGE

This page is dedicated to advertising for Chapter 190 members. It is, of course, free to members.

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## SERVICES OFFERED

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### ***The Montecito Clock Gallery***

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[dave@daveswatchparts.com](mailto:dave@daveswatchparts.com)

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### **- Chronometer -**

Hamilton 21 Marine Chronometer in running condition, with  
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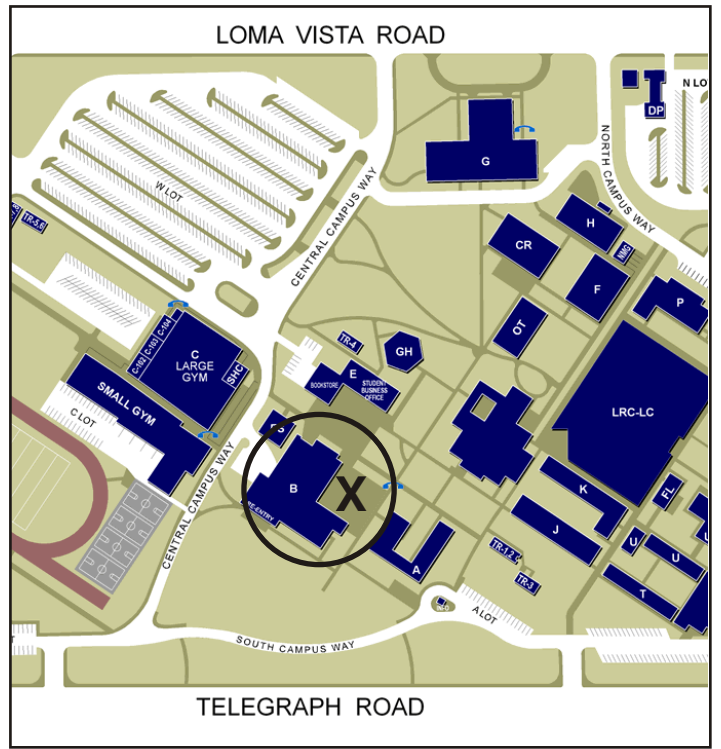
Please contact: **Giorgio Perissinotto**  
E-mail: [giorgio@spanport.ucsb.edu](mailto:giorgio@spanport.ucsb.edu)

### **- Watch Repair Tools -**

I'm just starting out and need just about everything.  
I would prefer to purchase an entire collection of old  
watchmaker's tools.

Please contact:  
**David Clarkin Tel: 805-988-4384**

The Chapter 190 meetings are held the third Sunday of each month. (No meeting in December)  
 We will meet in the cafeteria on the Ventura College campus. The cafeteria is located in building "B", east of the gym and athletic field.



*Hope to see you there!*

**August 2010 Issue**

**NEXT MEETING**  
**AUG 15**



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**Chrono Times**