

HOROLOGICAL TIMES™

ADVANCING THE ART, SCIENCE & BUSINESS OF HOROLOGY
June 2014

Join us this summer at the

2014 Annual Convention & Educational Symposium

Clinton, Maryland
August 21-23

AMERICAN WATCHMAKERS-CLOCKMAKERS INSTITUTE

New! Bergeon Tools at Jules Borel & Co.



BG7803

Watch Winders

- Heavier-Duty motor and enclosed back
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BG30180-A-C1	**3 white, 1 black**	**$ 135.00**
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BG7719-A	**Oiler**	**85.95**
BG7720-5	**Oiler**	**85.95**



Magic Wiper

- Easily capture small metal parts that roll away
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- Sold by the piece

BG7871	**1 each**	**$ 23.00**

Borel

Jules Borel & Co.

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The United States Capitol in Washington, D.C. (from Wikimedia Commons)
Image taken by Matt H. Wade

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Horological Times Advertising Policy & Editorial Policy

Advertising Policy for the Horological Times

The publisher reserves the right to approve all advertising copy and reject any advertisements not in keeping with the publisher's standards. The publisher may, at the publisher's sole discretion and for any reason and without notice, decline to publish or republish any ad, in which case any fees submitted or paid for such ads shall be returned or rebated to the advertiser. The publisher reserves the right to edit all copy. The advertiser and/or agency agree to assume liability for all content of advertisements printed. The advertiser will also accept responsibility for any claims or suits arising therefrom brought against the publisher. Printed articles may also be used by the publisher without permission expressly sought, or payment made, on www.awci.com, the American Watchmakers-Clockmakers Facebook page, or via other media.

Editorial material and letters of opinion are invited, but reflect the opinions of the authors only and do not represent the views of the American Watchmakers-Clockmakers Institute (AWCI), its directors, officers or employees. AWCI reserves the right to edit all submitted materials and is under no obligation to accept any submitted materials for publication. The appearance, reference, or advertisement of any product or service in this publication shall not be deemed an endorsement of such products, methods or services by AWCI, its directors, officers, or employees.

Publisher's Standards

AWCI makes a concerted effort not to publish any advertisement which promotes or depicts practices not in harmony with our professional Standards & Practices for Watchmakers & Clockmakers. The advertisement of generic parts, tools, and materials is allowed when such advertisement does not possess any trademarked image, brand, or name. Advertisers can refer to the items by name, function, quality, size, and description but shall not indicate that the parts are generic, aftermarket, or non-genuine. Phrases like "to fit [brand name]", "[brand name] style", and "generic" are not allowed. Genuine parts can be advertised as such in accordance with the advertiser's relationship and agreement with the manufacturer.

We encourage advertisers to reach out to our members and market goods & services which will help them to professionally service their clients and represent themselves in a way which will "reflect positively on him or her, on the AWCI, and the entire watch and clock repair industry, including all of its participants." – AWCI Code of Ethics

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www.facebook.com/HorologicalTimes

a message from the president

MANUEL YAZIJIAN, CMW21



Manuel Yazijian
myazijian@gmail.com

Dear readers,

As you read this message, summer has indeed arrived at our doorsteps and it's time to start enjoying more of the outdoors. Of course, this is true if you are in the northern hemisphere, where the days are getting longer and warmer. It is time to enjoy fun times with friends and family, barbecuing, swimming, playing sports, and taking advantage of what this season has to offer us. It is my philosophy that we should work to live and enjoy life and to be in the company of friends and family, instead of living *just* so we can work.

Speaking of barbeques and having fun outdoors, I personally invite you to come and enjoy our ELM Trust barbeque event this summer at our Annual Convention in Clinton, Maryland, which is just outside of Washington, DC. A variety of grilled fares will be served. I am truly looking forward to coming together and having a fun-filled time with my fellow horologists. Be sure to sign up soon, as the event is limited to 60 attendees. Type the following link in your browser for more information: www.awci.com/symposium/

Moving onto the business aspect of AWCI, I draw your attention to our Executive Director's message this month. You will notice we have made great strides in controlling our expenditures and improving our financial standing. I commend all the team members working on the Finance Committee, the Perpetuation Fund Committee, Executive Director Jordan Ficklin, and his in-house team in ensuring a positive outcome. Congratulations to all on a job very well done.

Continuing with AWCI business, it is yearly election time again this month. You should have already received your election mailer, which includes the list of candidates who are running for a position on the AWCI Board of Directors. Please take a moment to cast your vote for a candidate of your choice. Keep in mind that it is important to read and understand each candidate's platform, and vote accordingly. Those who are running for this volunteer position have made the decision to serve on the board and therefore give up a portion of their personal time for the further advancement of our profession. Whether one is a member of the Board of Directors or a regular member, it is important never to forget our main mission of "Advancing the Art, Science, and Business of Horology." It is equally important to put our personal interests aside and strive toward educating ourselves in not only improving our methodologies but to also work toward educating consumers about our higher standards of workmanship. Toward this end, I am pleased to inform you that the current Board of Directors unanimously voted to employ the services of an outside voting firm, which is completely independent of AWCI headquarters, to conduct the election process. Working with an independent company that specializes in elections ensures complete impartiality and transparency of the elections. You have the choice to vote electronically online, by phone, or via paper ballot. Please vote only using one method. Should you mistakenly cast a vote more than once, only the last method utilized will be counted, and previous votes cast will be voided.

"I am truly looking forward to coming together and having a fun-filled time with my fellow horologists."

I wish you all a great start of the summer filled with much fun and excitement.

See you in Clinton!

In the meantime, keep your skills honed, your standards very high, your attitude professional, your tools and equipment in great condition, and your workshops clean and organized—this is the only way we will excel.

JORDAN P. FICKLIN, CW21

a message from the executive director



Jordan Ficklin
jordan@awci.com

About the time this magazine reaches you, I will have just returned from the JCK show in Las Vegas. As I write this message I am completely involved in the preparations for the show. For the past several years JCK has generously donated a large booth to AWCI to help us promote our organization and offer some educational seminars. We are very grateful to them for that support. Even with this generous donation, our involvement in JCK is still a very expensive endeavor, and, like everything we do at AWCI, I am asking myself how our participation in JCK helps us to fulfill our mission and how much return on our investment do we receive. This year's trip to JCK will help me decide whether we will continue exhibiting in the future.

> "Our financial outlook is great and our professional outlook is optimistic."

When I confirmed our attendance at JCK this year, I had not yet been able to analyze the costs of previous years' participation in the show. But because I didn't want to lose our space, I agreed to participate. As I have made the preparations for this year's trip, I have become aware that our participation in past years has cost AWCI between $10,000 and $20,000—unfortunately with little ROI. This year we have scaled back our participation, and I anticipate it will cost us about $5,000.

So, what do we get for this investment? Our audience at JCK includes mostly jewelry store owners, sales people, and purchasers—not watchmakers and clockmakers. As professional horologists, these are your potential employers, clients, and/or business partners.

First, our goal is to represent each of you at JCK and promote your services to these individuals and help them understand how the services of a professional watchmaker or clockmaker who adheres to the standards promoted by AWCI will benefit their businesses.

> "Our goal is to represent each of you at JCK and promote your services."

Second, we wish to impress upon employers with watchmakers or clockmakers on their staffs the importance of those individuals being AWCI members and make them aware of the training opportunities available from AWCI.

Third, we wish to do some market research and learn whether or not there is a market for one-day AWCI bench courses that would be specifically designed for retail jewelers and made available around the country. Some examples of these courses would be: "How to Sell Watches," "Watch Bracelet Replacement & Sizing," "Selling Watch Repairs," "Profitable Watch Repair," and "Watch Take-In Procedures."

Lastly, we will be reaching out to potential advertisers for *Horological Times* and possible new members for our Industry Advisory Board in an effort to produce the immediate ROI that will allow us to continue building the AWCI brand with future participation in JCK.

Since I am talking about numbers, I want to just wrap up with an update on the membership and financial state of AWCI.

As of the end of April, AWCI has 1,660 members, 16 affiliate chapters, 22 members of the IAB, and 8 REC member schools.

At the end of the third quarter, our net profit is $777,691, due in large part, but not exclusively, to the growth of the Perpetuation Fund. We also have reduced expenses, and we are on track to reduce this year's expenses by $200,000 over last year while increasing income in every category except membership dues. For many years AWCI has been relying upon the growth of the Perpetuation Fund for operating expenses while still taking on additional debt. Over the last nine months, ALL of the money withdrawn from the Perpetuation Fund has been used to pay down debt or cover investment and interest expenses. AWCI currently has $7.8 million in assets with $430,000 in liabilities compared to $7.7 million in assets and $971,000 in liabilities at the end of the last fiscal year. Our financial outlook is great and our professional outlook is optimistic. As long as AWCI represents high standards and professional clock and watch repair, we have a bright future ahead of us!





2014 AWCI Convention

The Mary Surratt House Museum Tour



Date: Friday, August 22
Time & Place: Spouses who sign up for the plus-one registration will take a shuttle to Mama Stella's Ristorante Italiano for lunch and a presentation at noon; after a lunch, a tour of the Mary Surratt House Museum.

We've all read about the assassination of President Abraham Lincoln by John Wilkes Booth. But do you know about the assassination conspiracy....? Visit the Mary Surratt House Museum in Clinton, Maryland, to learn all about this fascinating part of American history. Built in 1852 as a middle-class farm house for the family of John and Mary Surratt, the historic Surratt House has national significance due to its role in dramatic events surrounding the Lincoln assassination conspiracy. Its owner, Mary Surratt, was convicted in the conspiracy and became the first woman to be executed by the United States government. The mission of the Surratt House Museum is to foster an appreciation for the history and culture of 19th-century Maryland and Prince George's County.







Driving to the convention?

From the north on I-95, take the Capital Beltway to exit 7A, which is Branch Ave. also known as Route 5 South. Once on this road, the hotel is located about 4 miles on the left, you will see it up on the hill.

From I-95 South, take the Beltway to exit 7A, onto Route 5/Branch Ave. and go approximately 4 miles. Hotel will be on the left; there is a left turn for you to take off the highway.

Flying?

The closest airport is Reagan National. There is no hotel shuttle; the airport is about a 25-minute drive. Once you pick up your rental car, leave the airport and take Route 1 South. This is a nice tour through old town Alexandria, and it will take you to I-95/495 North. Look for exit 7A, which takes you onto Branch Ave., which is also Route 5. Follow Route 5 South about 4 miles. There will be a left-hand turn off the highway just before the hotel. If you miss it, go further and turn around.

Anyone taking Amtrak?

There is a Metro connection at Union Station in Washington, DC. Just take the METRO Green Line to the last stop which is Branch Ave. It is about a 10-minute ride to the Branch Ave. station. Call the hotel and someone will pick you up, as they do have a shuttle that travels within a five-mile radius of the hotel. Hotel phone number is: **(301) 877-4800**

For train schedules and information about the METRO, go to **www.wmata.com/rail**

Full Registration $425*

Includes: Awards Banquet, Spare Parts Workshop, Continuing Education Courses, Vendor Fair, Networking Opportunities, Hot Breakfast every morning, Lunch on Friday, Welcome Reception, Keynote Presentation, Business Meetings, Hospitality Suite

*($525 after July 15)

Educational Symposium Only Registration $329*

Includes: Awards Banquet, Spare Parts Workshop, Continuing Education Courses, Vendor Fair, Networking Opportunities, Saturday Breakfast, Hospitality Suite
*($379 after July 15)

Plus One (Spouse/Children) $159*

Includes: Awards Banquet, Hot Breakfast each morning, Off-site visit to area attractions, Friday Lunch (See p. 6)
*($199 after July 15)

Deluxe King Room $99/night + taxes
Deluxe Double Double $109/night + taxes

Schedule of Events (Subject to Change):

Wednesday Aug 20

3-6pm
Early Registration

Thursday Aug 21

8-10am

Keynote Address: Preserve, Repair, or Replace? A Monumental Question

On August 23, 2011, an earthquake shook the Washington, DC, area, damaging both the Washington Monument and the Washington National Cathedral and leaving many decisions regarding conservation, preservation, and restoration in the aftermath. Wiss, Janney, Elstner Associates, Inc. will walk us through these decisions as a case study that can be used as each of us face similar decisions as we repair, restore, and service vintage timepieces.



10:15am
IAB Meeting & Affiliate Chapter Meeting

1:30pm
Board of Directors Meeting

7-9pm
Welcome Reception
Sponsored by Swatch Group USA

Friday Aug 22

8-11:30am
Committee Meetings, continuation of BOD Business

8am-4pm
Vendor Fair

12:00pm
The Mary Surratt House Museum Tour (Info on p. 6)

1-5pm
Continuing Education Classes

Educational Symposium: Andy & the Automaton:

Andrew Baron discusses the wonderment of the Maillardet Automaton at The Franklin Institute and his involvement in its restoration and preservation, as seen in *Horological Times*.



Assessing your own work: Quality control from the perspective of CW21 Exam Assessors.

Chief Examiner Wes Grau, CMW21, and Aaron Recksieck, CW21, give insight into the way CW21 examinations are graded, as they talk about ways in which you can control quality and assess your own repair work.
Sponsored by SY KESSLER SALES, INC. • Renata Batteries * GemOro Products

Handling, measuring, and repairing main-springs, tooth and lantern pinion replacement.

Michael Gainey, CC21, brings his years of experience and covers these two topics for clockmakers.

Isochronism: It isn't just for theory exams:
John Davis discusses a favorite CW21 exam topic: Isochronism, the obstacles that prevent watches from being iso chronous, and how knowledge of this theoretical topic can be applied in your daily repair activities to help watches keep better time.
Sponsored by Nesbit's Fine Watch Service

6pm

ELM Trust Fundraising Cookout
Friday evening there will be an ELM Trust fundraising cookout for an additional cost of $50 for those interested in attending and supporting the ELM Trust
(limited to 60 attendees)

Saturday Aug 23

8-11am
Vendor Fair

8am-12pm
Continuing Education Class

1-5pm
Spare Parts Workshop

Bringing together watchmakers, material distributors, manufacturers, watch collectors, and enthusiasts with the goal of formulating new ideas about spare parts distribution.

6:30pm
Reception

7-9pm
Awards Banquet
Sponsored by Rolex USA

Nightly 9pm-12am
The Escapement Hospitality Suite
Sponsored by Cas-Ker Co.

Colony South Hotel & Conference Center
(Rate Code: 140820AWCI)

Located just a few miles from the US Capitol, the White House, Joint Base Andrews, the National Mall, and the Smithsonian Museums. Shuttle service provides transportation to the Metro Subway, Joint Base Andrews, and a designer discount shopping mall.

Hotel Amenities

- Free parking
- Dining
- Spa & fitness center
- Indoor swimming
- Tennis and racquetball courts

Editor's Forum

I receive emails and phone calls from readers who want more information about something that was published in *Horological Times* or who just want to comment on what they've read. I'd like to share these comments, questions, and answers with you and hope that you will benefit from reading about what's on the minds of your fellow horologists. I look forward to hearing from you.

Donna Hardy
Managing Editor

Tools, Tools, Tools

One thing I've learned since becoming Managing Editor of *HT* is that watchmakers and clockmakers love tools. This month we're featuring eight articles on tools: three articles on new or updated tools; a report from Baselworld 2014; an update on how to use the Horia tool to replace balance staffs; and three articles on fabricating your own tools. See our Special Tools Section beginning on p. 15.

From Our Readers

"The new direction the HT is being written in is good and positive. I like what is being presented. . . . I would also like to pass along appreciation to Dale LaDue and Jack Kurdzionak for their contributions to the HT. . . . They are very interesting articles to me. Keep them coming."

-F. Martell Grover

While we always strive to present the latest AWCI and industry news and new articles that help horologists do their work, we've realized that HT has a wealth of useful information stored in its archives. We've reprinted a couple of J.M. Huckabee's "Ask Huck" columns this year. F. Martell Grover and Bob Little both said they enjoyed reading them. Says Martell, "There have been some great columns in the past that are timeless and useful, now and then."

Let us know what you find interesting and useful. Email editor@awci.com or donna@awci.com.

Horological Times Is Now on Facebook

If you have not already liked *Horological Times* on Facebook, do it now! Here is where we'll put extra content, such as video clips, links, previews of upcoming articles, and other great watchmaking and clockmaking information. If you don't have a Facebook account, maybe now is the time to create one.

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Discussion on Battery Testing

In May HT, Jack Kurdzionak's column, From the Workshop, "Assault on Battery" (p. 17), discussed testing watch batteries. Jack contended (based on his discussions with a professor of electrical engineering at MIT and a battery manufacturer's representative) that new batteries should not be tested prior to installation, in case testing damages them. This sparked some debate among the members of the HT Advisory Committee. Below are some of their comments and Jack's responses.

Comment: One thing Jack did not mention is that each battery when removed should be tested. Quite often the battery is OK but the watch does not run. So it would be a waste of time installing a new one unless the movement is fixed.

Response: The point about testing the old battery is well taken. That is, if the watchmaker owns a high-quality battery tester.

Comment: I have never seen a battery go bad using a proper battery tester. Even using a bad one, a quick test should not damage the battery.

Response: I actually had lunch with the CEO of a major battery company last week in Switzerland, and he fully agreed with me about not testing new batteries. Don't do it.

Other Comments from Jack

- Watchmakers need to buy their batteries from suppliers who rotate their stock and sell fresh batteries. They need to ask their suppliers how long they have been in stock.
- Watchmakers need to rotate their own stock and dispose of old cells.
- If you have weak batteries from any supplier, they should be immediately returned to their source for evaluation. Is your tester damaging the battery?
- Renata frequently advertises their dating system as a sell-by date, so watchmakers should be aware of that. Every current-production Renata battery has that date on each individual package. Energizer puts their production date on each box of 100 batteries.





#13 BEST SMALL TOWNS TO VISIT

COLUMBIA, PA

"Columbia is home to one of the world's only horology museums..."

2014 IS THE THIRD ANNUAL *SMITHSONIAN MAGAZINE* LISTING OF BEST SMALL TOWNS TO VISIT, compiled using the criteria of "communities with strengths in history, music, visual arts, learning, food, theatre, and science." Columbia, PA, was voted *#13 Best Small Town To Visit in 2014.*

Columbia is home to one of the world's only horology museums, the National Watch and Clock Museum. Our Museum collection includes 19th-century American clocks and watches, and timekeepers from China, Japan, Germany, France, the Netherlands, and Russia.

National Watch & Clock MUSEUM

UPCOMING EVENTS

HOPS 'n' CLOCKS
ANNUAL PA MICROBREW & FOOD TASTING
July 11
6 p.m.-9 p.m.

Call 717-684-861 ext. 211 for details and to purchase tickets.

Make-and-Take Workshops
No reservations required
June 2-Aug. 25
11:30 a.m.-2 p.m.

Contact Director of Education Katie Knaub at 717-684-8261, ext. 237 or education@nawcc.org.

Check out www.museumoftime.org for more info.

FULL ARTICLE: http://www.smithsonianmag.com/travel/20-best-small-towns-to-visit-in-2014-180950173/?no-ist

AMERICAN WATCHMAKERS -

AWCI continuing education courses are designed to help professional watchmakers continually improve their skills and stay current on changes in recommended service techniques. We are offering a combination of refresher courses, advanced level courses, and courses designed to prepare individuals for the CW21 (Certified Watchmaker) Exam. Previous work on watches in a watch repair environment is recommended—for example, self-employed, factory service center, independent service center, or store manager.

Not sure which course to sign up for? Please log on to our website and fill out the Professional Experience Questionnaire. Contact us so we can help you find the best course suited to your skill level, expertise, and interests.

Don't see the course you want here? We are always trying to expand and improve our course offerings and we welcome suggestions. We may also have a course already developed that isn't scheduled, and we can try to accommodate you.

Looking for someone to come to your business, chapter, or guild to teach a course? We do that too. Please contact our education and certification coordinator for more information.

Basic Watchmaking III
(JUNE 16-19)

Basic Watchmaking III covers the same fundamentals as Introduction to Watchmaking but is intended for individuals who have been working on watches but do not have formal training and would like to start the continuing education process to raise their proficiencies to meet those required by the Standards & Practices of AWCI and the Industry as a whole. It is a hands-on course that provides the essential feedback from an instructor that you can't get learning watchmaking from a book or on the Internet, and is an excellent course for anyone who needs some valuable instructor feedback before taking (or re-taking) the CW21 exam.



Basic Lathe Work
(JULY 7-10)

The purpose of this course is to teach the student basic micromechanics skills and all the basics of operating a watchmaker's lathe. Students must read chapter 12 of *The Modern Watchmakers Lathe and How to Use It* by Archie Perkins prior to attending the course. Duration of course: Monday, Tuesday & Wednesday 7:00 a.m. – 6:00 p.m. and Thursday 7:00 a.m.- 3:00 p.m.

Students will learn about:

- Measuring and measuring tools
- Sawing
- Various methods of filing
- Drilling
- Introduction to the lathe and its care
- Use of gravers, their shapes, and principles of cutting geometry
- Sharpening gravers
- Turning square shoulders and tapered surfaces
- Cutting an inside and outside thread
- Other applications of the lathe, e.g., cutting out a balance staff.

We hope to see you, your friends, and your associates in our classroom soon!

For additional details about specific courses in comprehensive syllabi form, including complete tool lists, visit: http://www.awci.com/education-certification/education2/list-of-continuing-education-courses/ or contact Cindy Whitehead at 866-FOR-AWCI (367-2924), ext. 303.

CLOCKMAKERS INSTITUTE

JUNE 16-19

Basic Watchmaking III
(See description on p. 10)

JULY 7-10

Basic Lathe Work
This course covers preparing and sharpening cutting tools, cutting geometry, turning cylinders, and drilling on the lathe.

JULY 28-30

CW21 Exam
Lititz Watch Technicum
Lititz, Pennsylvania

AUGUST 11-13

CW21 Exam
North Seattle Community College
Seattle, Washington

AUGUST 21-23

Annual AWCI Convention
Continuing Education Classes
Clinton, Maryland

SEPTEMBER 8-11

Precision Timing
The purpose of this course is to teach students the most common causes of timing errors and methods of correcting them. Performing precision timing exercises, including staffing, static and dynamic poising.

SEPTEMBER 22-25

Modern Automatic Watches
The purpose of this course is to teach the student all the fundamentals of modern mechanical automatic watch repair that are most prevalent in today's market. The student will learn how to perform the various diagnostics in evaluating the condition of the various components, cleaning, assembling, adjustments, dialing, and casing.

OCTOBER 6-9

Quartz Watches, their service and repair
The purpose of this course is to teach the student all the fundamentals of modern basic quartz watch repair and quartz chronographs that are most prevalent in today's market. The student will learn how to perform the various important electronic tests, e.g., current consumption, coil resistance, lower working voltage, fault finding, etc.

NOVEMBER 10-12

CW21 Exam
OSU
Community College
Okmulgee, Oklahoma


Modern Mechanical Chronograph 7750



Modern Mechanical Chronograph—ETA 7750
April 14-17 Class
Back Row (left to right): Gary Zape, Steven Ho, Ronny Medawar, David Medawar, Thomas Glasnovich, Robert Flood (Instructor from Breitling USA)
Front Row (left to right): David Henkel, Daniel Liu, Kyle Johnson, Cindy Whitehead (Education & Certification Coordinator), Francis Zape

Balancing Act

An Update on Balance Staff Removal

By Wesley Grau, CMW21

The AWCI CW21 examination includes the task of replacing the balance staff. This exercise has changed due to the availability of certain replacement parts. While the certification process was being reviewed in 2013, the task force decided to make replacing the balance staff more relevant by moving it from a static to a dynamic task—dynamic meaning that the task is performed on an actual working watch as opposed to a nonfunctioning platform. We are requiring examinees to replace a balance staff in an ETA2824-2 caliber movement. There are multiple approaches to this that can lead to a successful completion. AWCI is currently using Glucydur balances, which allow the removal of the balance staff with minimal distortion if the balance staff is pressed or punched out as opposed to cutting out or by using erosion removal methods. This will be discussed later in this article.

Having invented the hairspring in 1675, Christiaan Huygens is responsible for the development of the balance assembly as we know it today. Although it has varied in its materials and construction over the last 300 years, its basic construction remains the same today. Recently, because of the change in spare parts distribution policies with modern calibers, there has been a shift to supply balance assembly complete rather than separate replacement components. As a result, some people question the need for balance staff replacement to be part of the CW21 exam. The skills required for balance staff replacement are valuable and can be applied to many different aspects of modern watch repair. Balance staff replacement continues to be taught in watchmaking programs throughout the world. Because of this, those who are involved with the administrative and assessment process of the exam feel that a watchmaker's ability to perform this task is an essential proficiency that must be assessed in the certification process.

The replacement of the balance staff traditionally involves the removal of the balance assembly from the cock or bridge. Then, the balance is dismantled by first removing the hairspring, then removing the roller table, and finally the staff itself. Over the years there have been variants in this configuration that have required specialized procedures or specific or modified tools. Some of these variations include friction staffs (used by both American and Swiss manufacturers), the Durabalance assembly used by Elgin, and a variety of different hairspring attachment methods.

Recent changes in the construction of the balance components have created a new challenge for their handling and disassembly, but that doesn't mean that it is impossible. This is not the first challenge this particular component has presented. It does require education and training in different or new approaches. An instructional video showing a more modern approach to the disassembly of the balance is on the AWCI website. In addition, AWCI has developed a technical drawing of a pusher that is utilized in the Horia tool for this method. Are there other methods to disassemble a balance complete? Yes, and this could be a topic for the watchmaking community at large to discuss. Since AWCI is currently using Glucydur balance assemblies, it is possible to remove the balance staff by pressing the staff out using a pusher that is small enough to pass through the hairspring collet in association with using a stump that is just large enough to allow the hub of the balance staff to pass through. (See the sidebar, How to Use the Horia Pusher to Remove a Balance Staff, p. 14.) Other methods involve specialized tools for removing the hairspring, and then removing the staff by cutting out in the lathe, or erosion removal process.

http://www.awci.com/education-certification/certification/watchmaker-preparation/watchmaker-study-guides/

Balance Staff Removal and Installation

This process applies to modern chronometer-grade ETA calibers with ETAChron adjusting systems and Glucydur balance wheels but can be adapted to many different calibers.

1. Open regulator pins.
2. Remove the stud from the adjustable stud bridge.
3. Remove the balance cock or bridge from the watch.
4. Mark the orientation of the impulse pin and stud using a permanent marker on the rim of the balance wheel.
5. Remove the roller using your preferred style of roller remover or two single-edge razor blades. See Figure 1.
6. Measure the staff (for use in comparing to new staff before installation).
   a. Some dimensions cannot be measured until further disassembly takes place, but the total length should be measured before moving on to step 7.
7. Remove the upper pivot of the balance staff. Usually this is accomplished with steel tweezers.
8. Remove the staff and hairspring using the Horia tool. As you push out the staff, the hairspring will come free of the balance staff.

By using this method instead of levers, you can avoid the risk of slipping and damaging the hairspring. See Figure 2.

The Glucydur balance wheel is hard enough that the riveted portion of the staff will break before the balance wheel. The balance staff then comes free from the wheel without enlarging the hole. A small ring will remain in the balance wheel, which must be gently pushed out. Examining the break will reveal the crystalline structure of the hardened steel staff. See Figure 3.

This structure is the result of the hardening and tempering process during manufacturing and imparts both the hardness to the staff as well as the brittle nature that allows it to break free during this removal operation. The additional stress imparted during the riveting process likely contributes as well to the ability of the staff to break free cleanly.

9. Remove the broken rivet from the balance wheel [rivet]. See Figure 4.
10. Record the collet diameter and hub diameter.
11. Check the flatness of the balance arms.
12. Rivet the new staff and test for tightness. See Figure 5.
13. Install the roller.
14. Adjust the balance wheel so that it turns flat and true.
15. Clean the balance wheel and remove the ink marks.
16. Poise the balance wheel using static methods.
17. Install the hairspring.
18. Adjust the hairspring for flatness and concentricity, if necessary.
19. Install the balance assembly on the balance cock or bridge.
20. Install the balance bridge in the watch.
21. Close the regulating pins, make any further adjustments, and regulate the watch.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

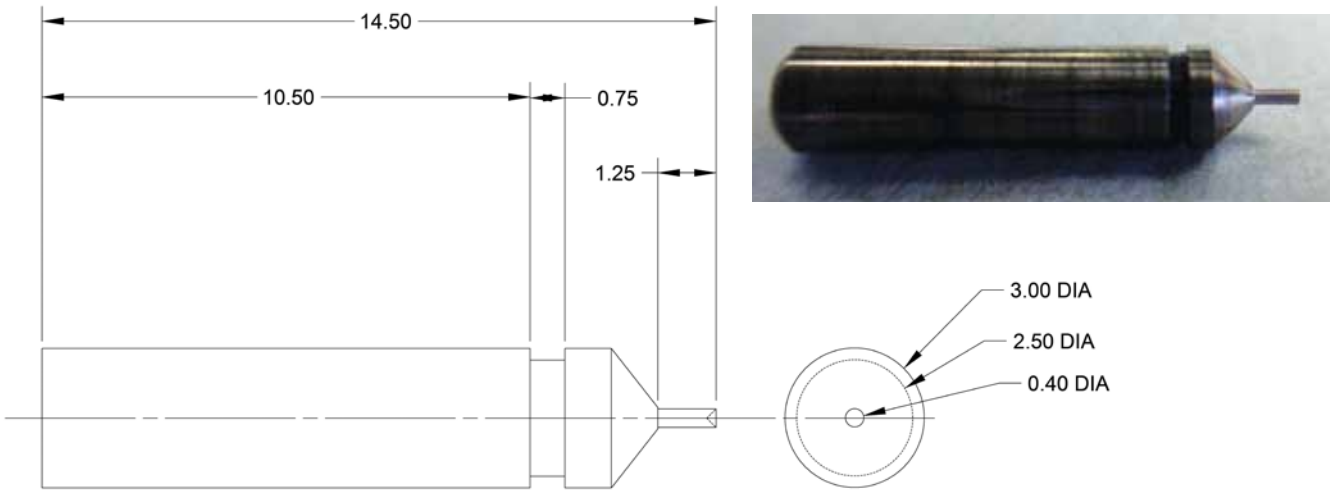
How to Use the Horia Pusher to Remove a Balance Staff

A modern method for removing a balance staff (acceptable for use on the CW21 exam) is to use the Horia pusher to break the rivet of the staff and push it out.

The roller is removed from the staff, and the balance wheel is supported in the Horia tool (or other similar micrometric jeweling tool) with the roller-side down on the smallest stump that will allow the hub of the staff to pass through. A small pusher is used in the top, and a very quick turning motion is used to quickly lower the pusher and pop the rivet off. This allows the staff to come out without enlarging the hole. If you have chosen a small enough pusher, it will pass through the hairspring collet and release it as well; otherwise, you will need to remove the hairspring before performing this operation.

Below is a drawing of a pusher with the appropriate dimensions to remove the staff from the ETA 2824 movement. The tool should be turned from soft steel on the lathe and hardened and tempered to a straw color (tool hardness) before using.

Warning: This operation should only be used with chronometer-grade balances made of hard material like Glucydur. Performing this operation on a nickel balance wheel may result in the hole enlarging sufficiently that you will not be able to fit a new staff.



Measurement units are millimeters.



New Watchmaking Tools



New from Bergeon

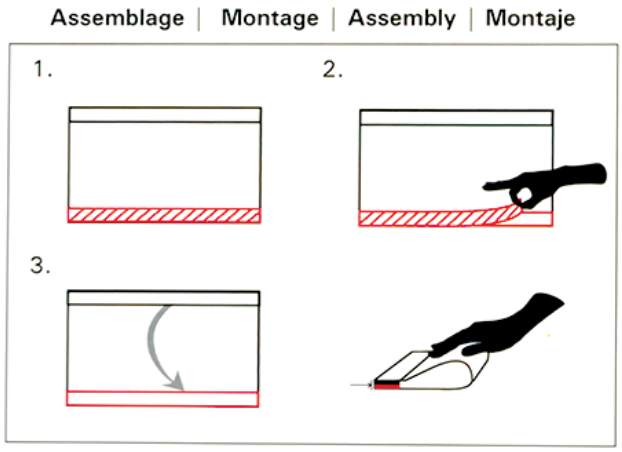
BG7802 and BG7803 Watch Winders

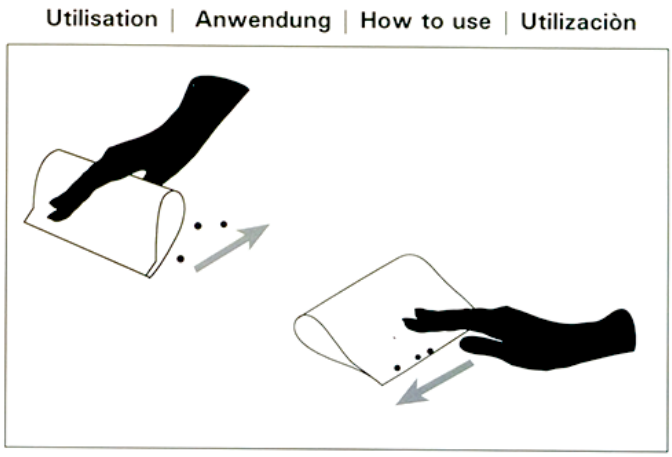
A newly designed strap and post allows watches with or without bands to be securely and easily attached to the foam supports for testing automatic watch winding. Mount unit vertically on the wall. A power reserve comparison chart is printed right on the machine. BG7802 runs at 1 RPM and BG7803 runs at 4 RPM.

BG5393 Case Cushion

New large-size case cushion is made from a non-slip special material that's washable with soapy water or BG7040 wipers. Case cushion is reversible with one flat side and one indented side.







BG7871 Magic Wiper

The Magic Wiper is designed to easily capture small metal parts that roll away or fall on the floor. An 11"-long magnetic strip is attached to washable, tear-proof paper. A self-adhesive strip allows you to roll the paper to provide a comfortable grip. Two pieces per package, but available individually from Jules Borel & Co.



BG7721 Lubricators in Stand

Three new oilers are designed for precision oiling, replacing the 2718-20 series. BG 7718-A places lubrication for shock protection in watches and balance bearings without removing the cap jewel. BG7719-2A lubricates pallets, mechanical parts, and other difficult to reach places. BG7720-5 is designed to place oil after the tip is positioned into train wheel pivots, cup bearings, and more. Purchase BG7721 to get all three oilers in a convenient stand.



BG30180-A-C1 and BG30180-A-C2 Oil Cups

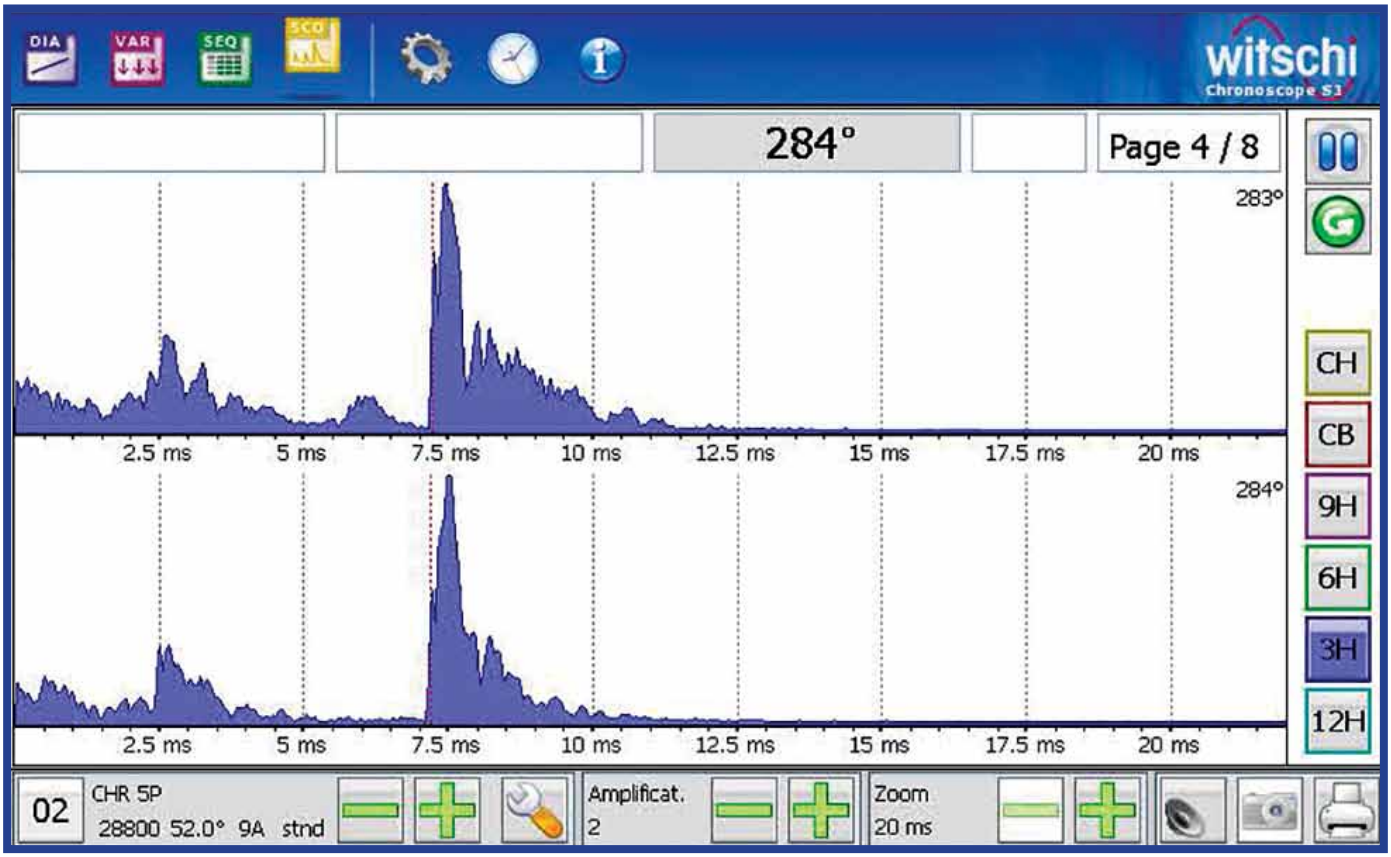
Oil cups in a die-cast alloy stand are like the BG30180-A, but with a new cup material for better visibility of your oils. Instead of ruby cups, C1 has three white ceramic cups and one black cup, and C2 has four white ceramic cups.

New from Witschi

TS Chronoscope S1G2 Second Generation Mechanical Analyzer



The second-generation Chronoscope S1G2 utilizes an easy-to-use touchscreen to test mechanical watches. With the Sequence Display mode, test and compare the watch in two to six positions on the Micromat S microphone. A new Twinscope mode simultaneously visualizes the beat noises of Tic and Tac.



Screen shot from the TS Chronoscope S1G2 Second Generation Mechanical Analyzer



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LEADING SWISS PRODUCTS



The Matador 4000

Time Machine Repair introduces the Lititz Precision Products Matador 4000, a modern ultrasonic cleaning machine for under $4,000.

The Matador is now available after nearly three years of design and modifications. Until now, watchmakers have had limited options for ultrasonic cleaning; they could either acquire an older, used machine or pay more than $12,000 for a new automatic one. The Matador retains all functionality of the successful Vibrograf Mark V, which has been out of production for nearly five years. While the Matador maintains all the features and capabilities of the Mark V, it has advantages and improvements over this older machine.

The Matador has four stainless steel 8-oz. cleaning/rinsing cups with a movable ultrasonic transducer head and a variable speed/variable temperature dryer. The older Watchmaster and Vibrograf parts baskets are useable with the Matador. Most watch manufacturers now require ultrasonic cleaning with three rinses.

The Matador uses less than 8 oz. of solution per cup, providing a significant operational cost savings. The machine has only four inserts for the cups, you can buy additional cups and use them with the transducer for pre-cleaning or case cleaning by replacing any of the basic cups for these extra tasks or positioning the added cups adjacent to the Matador.

The Matador is controlled by a microprocessor via a simple four-line control panel on the front of the machine. The ultrasonic generator is also tunable at the front panel controls. This panel has user-selectable languages—English, Spanish, French, and German.

The Matador has dual timers that produce an audible alarm at the end of the cycle, allowing simultaneous cleaning and drying operations. The dryer cup is driven by a brushless motor and is permanently mounted to the machine via dual ball bearings, eliminating the wobbling and vibration common in the older machines. The dryer can be set to 200 to 1,000 rpm, and at low, medium, or high temperatures.

Both the ultrasonic head and the dryer are protected by thermostats that will shut down the machine if over-temperature conditions are detected.

The Matador is designed, manufactured, and supported in the USA.

The Matador is 16″ wide, 10″ deep, and 6″ high, and weighs 16 lbs. It includes the four stainless cups and a large basket divider that supports cleaning of a pocket watch and/or up to four wristwatches.

Go to www.timemachinerepair.com for further information and to see a video of the machine in operation.

The ML8RH Diamond Tool Holder: A Review

By Paul Corn

About a year ago I purchased three ML8RH Diamond Tool Holders through Bay-Com Enterprises, Inc. (www.bay-com.com)—one for me and one each for my two students.* In clock work, the operator will only need to purchase a right-hand Diamond Tool Holder because you cut toward the headstock most of the time. The tool holder is small enough to be used in the Sherline, mini, and larger lathes. It will not work in a WW lathe using the slide rest because the tool is too large. It is called "diamond" because of the shape of the cutter. The cutter cuts the metal on its sharp, pointed edge—the same as lathe gravers do. The user can do general turning and cut very sharp shoulders using this tool. I highly recommend this tool; it's well worth its cost at under $100, Figure 1.



Fig. 1

The good thing about this tool is the user doesn't have to be experienced in sharpening lathe tools. The tool comes with a sharping jig so the cutter can be sharpened the same way every time. The user will need to have a 5"-to-6" bench grinder to sharpen the cutter, Figure 2.



Fig. 2

When using the Diamond Tool Holder in the Sherline lathe, the Sherline straight tool post will need to be offset because the square cutter is too long and will hang over the edge of the cross slide, unless the square cutter is cut off shorter, Figure 3. In order to have the square cutter bit on center of the work, it will have to be down in the holder as shown in Figure 4. The cutter is adjusted up or down using an Allen wrench.

Using drop-in tool holders for these lathes, centering the Diamond Tool Holder is easier using the adjusting nuts on the drop-in holder. Once set, the cutter will always align on center, Figure 5. Notice that the cutter bit sits up higher in the Diamond Holder when using a drop-in tool holder, Figure 6.



Fig. 3

*Bay-Com Enterprises, Inc., is the only authorized supplier in North America for the Diamond Tool Holder, which is made in Australia.

View the video of the ML8RH Diamond Tool Holder at www.bay-commedia.com/dth



Fig. 4



Fig. 5

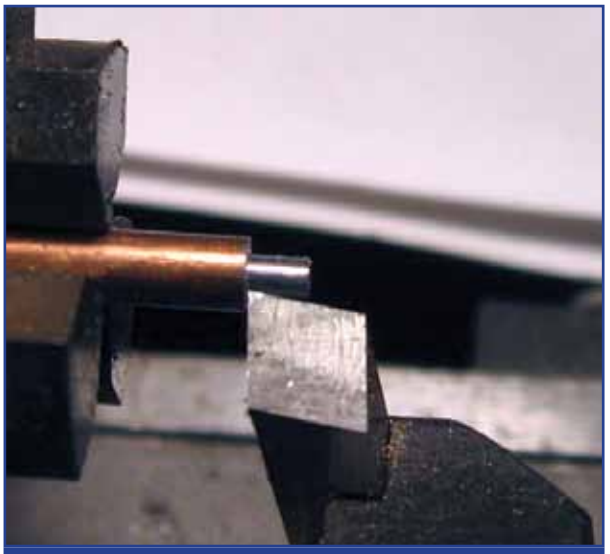


Fig. 6

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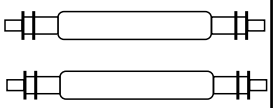


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Shop-Made Tools Born of Necessity

By Dale LaDue, CMW21

Dale LaDue explains the origin and uses of some of his own shop-made tools fashioned from repurposed materials. These tools help him perform repairs on various types of watches with ease and accuracy.

The definition of a tool is "a device or implement used to carry out a particular function" or simply "a thing used in an occupation." Other synonyms are gadget, apparatus, utensil, machine, contrivance, or the informal term gismo. Watchmaking, from its earliest stages of development to today's exotic materials and manufacturing processes, was and is considered high tech. The manufacturers of the past needed to build machines, jigs, and fixtures in order to attain and maintain precision in mass production. The continuum of high-tech tooling for manufacturers dictates higher-tech tools for the repairperson. As an example, the shop regulator with its compensated pendulum as a time source and a framed board with a multitude of neatly spaced hooks on which watches were suspended and regulated has given way to the modern instant timing/amplimeter multi-positioning diagnostic machine!

Perusing old watchmaking tool catalogs indicates the plethora of tooling available to that generation of watchmakers. Many of these handy "gadgets" do not lend themselves to the repair of modern (let's say 21st century) timepieces; and yet as long as there are watchmakers repairing vintage and antique watches, these old tools can be utilized. Many of the watchmakers in the past couple of generations made several of their own hand tools, and some were even patented and sold through watch material houses. I have a late-19th-century "barrel contractor" that was made by a watchmaker and patented in Monroe County, Rochester, New York, which is my hometown.

I would like to share with our readers some of the "tools" that I have contrived and that have worked for me in my endeavors to provide the best possible workmanship. We all need tools in watchmaking, and the high tech as well as the low tech can only produce professional results with the coordination of our hands, eyes, and minds.

Figure 1 shows a modern cordless rotary tool attached to a century-old milling attachment. A block of aluminum was milled to allow adjustability with the mill and positive alignment for the rotary tool. An adjustable steel hose clamp provides an unyielding grip. **Figure 2** depicts a mandrel-mounted grinding wheel easily and precisely grinding the square for the manufacture of a pocket watch stem. With proper lathe head indexing, a couple of simple calculations, and precise measurements, a square can be produced that rivals or betters a factory mass-produced square.

Figure 3 shows a cylinder escape wheel from a platform escapement being supported at its far end for pivot work. The support is a replaceable, customizable, and adjustable short section of mainspring steel screwed to a rod. The base for this support is a small brass table that is clamped in a lathe tee-rest post. **Figure 4** shows the drilled sleeve that supports and allows the rod to be raised or lowered and clamped in place with an Allen-head screw.

A simple shop-made holder is a perfect example of repurposing dental burrs as lathe cutting tools. **Figures 5 and 6** show the carbide-tipped dental burrs in their simple steel holder. (See April and May 2014 *HT*, "Dental Burr Tool Holder.")

A single-purpose tool was made that worked perfectly to remove an under-dial mainspring pre-tension ratchet that's had its arbor square damaged. **Figures 7 and 8** show the tool securely gripping the wheel. Who knows, it may come in handy for another repair. (See October 2013 *HT*, "Fusee Mainspring Ratchet Tool.")

Figures 9 and 10 show a shop-made balance bridge holder. Small, ladies' watch balance bridges can be securely clamped while removing or replacing hairspring studs and performing hairspring adjustments.

Thinking outside of the proverbial box can provide some interesting solutions as shown in **Figures 11 and 12**. A pipette, a short section of brass tubing, and a silicone oxygen nose cannula were assembled and used to draw watch oil into the Bergeon automatic oiler reservoir. This method fills the reservoir through its tip, preventing an annoying bubble and will also avert contamination from repeated dipping of a screwdriver blade into the vial of oil in order to transfer it to the reservoir.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12


Fig. 13

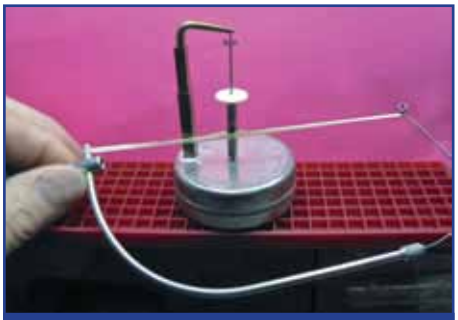

Fig. 14


Fig. 15

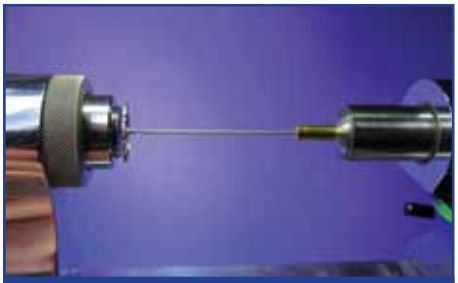

Fig. 16


Fig. 17

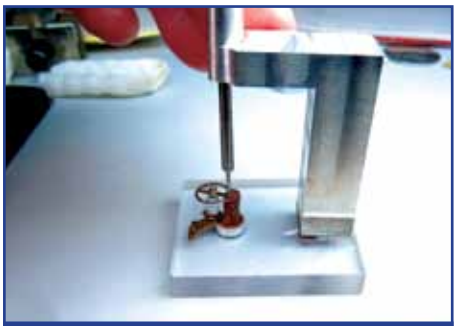
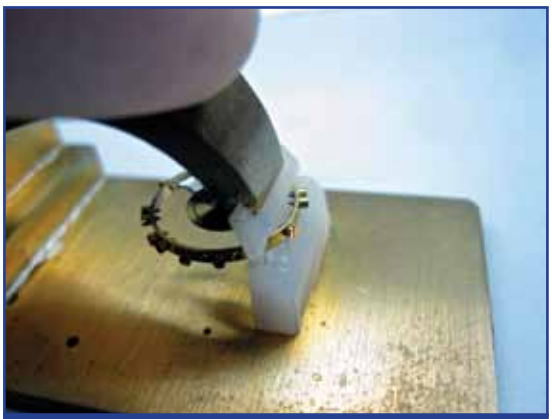

Fig. 18


Fig. 19


Fig. 20


Fig. 21

> "The high tech as well as the low tech can only produce professional results with the coordination of our hands, eyes, and minds."

I had a few different-sized taper mandrels that were apparently made to hold a variety of collets, from wrist- to pocket-watch-sized hairsprings, for corrective adjustments. **Figure 13** shows a small wristwatch collet on a taper that is held at the top by the shop-made holder shown in **Figure 14**. A bow with a rubber band drawn gently to and fro can revolve the taper and hairspring, allowing a more critical view of the hairspring's geometry.

Figure 15 shows a taper lathe collet with a few shop-made brass tapers. The holes drilled in their ends match the different sizes of carbide rods that I use to make tiny spade repivoting drills. The taper collet with a tapered brass inserted and held in a collet-holding tailstock helps maintain centering of the drill as shown in **Figure 16**.

Figure 17 shows a tool that was fabricated from block aluminum and screwed to a Plexiglas base. It was created to precisely remove very small drill shavings from the underside of screwless balance wheels. The fixture was drilled to fit 1/8″ drill rod and milled to shape. Small spade drills of different sizes were fashioned on the rod ends, and a few different-shaped support stumps made of non-marring wood, and phenolic resin rods were turned on the lathe. **Figures 18 and 19** show the tool removing metal in order to correct an out-of-poise condition.

Figure 20 shows a shop-made fixture that holds a balance wheel between two stiff non-marring Delrin or nylon pads, which facilitates the removal and replacement of the balance screws. The upper arched arm is hinged, and finger pressure applied to it holds the balance in place distortion-free as shown in **Figure 21**.

Each of these tools is used to carry out a particular task that they all do very well. However, the perceptive thought, hand/eye coordination, and the acquired skills that go into creating your own piece of equipment are ancillary to the pride of accomplishment. This will greatly enhance your capabilities in this profession we call watchmaking.

Collet-Holding Drop-In Tool Holder

By Paul Corn

A 3/8″ boring bar drop-in tool holder was modified to hold WW collets as well as holding 3/8″ boring bars. Now you can have two tools in one. The purpose of this collet-holding modification is to hold round stock for cross drilling, grinding new reamers, and grinding new pins for Brocot escapements. The holder can be used for miniature boring operations, when the shank of the boring tool is round, or when a ball bur is used. See the modified holder in Figure 1.

To Modify the Holder

A Sherline collet-holding adapter was used to determine the angle to machine the taper. A boring bar was placed in a tool holder in the tool post, and the compound was set to match the taper of the adapter, Figure 2. The set screws were removed from the holder, and the holder was placed in a four-jaw chuck. Then the 3/8″ hole was centered to run true. After the taper was turned, the holder was removed and reversed to turn a taper on the other end. This way, the holder is more versatile, Figure 3.

Making the Draw Bar

A piece of 3/8″ steel tubing with a 1/4″ inside diameter X 1.330″ long was used for the draw bar. The tubing was tapped using a WW tap 40 threads x .270″. These taps can be purchased through Sherline. After the tubing was threaded, it was parted off, Figure 4. The hand nut was cut from a piece of 1″ diameter brass bar 3/8″ long. A hub was machined 1/8″ in height and 5/8″ in diameter. While still in the chuck, the hand nut was center spotted and drilled with a 3/8″ drill, Figure 5. The steel tubing was a little oversized, and using a vice with smooth jaws made a nice press fit on the hand nut. The draw bar was placed in the lathe and the back end of the hand nut, and tubing was machined flush. Then the hand nut was knurled to complete the draw bar, Figure 6.



Fig. 1

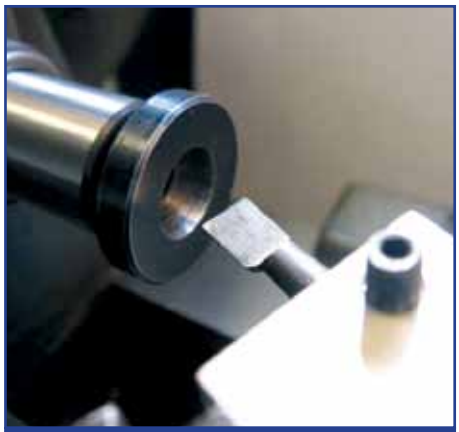


Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

To Center the Holder

Use pointers for the centering. With a lathe center in the headstock and a pointer in the holder collet, center the holder by raising or lowering the height nuts, and move the cross slide in or out until the tips of the pointers match. Then tighten the two height nuts. Once the height is set, the holder will remain on center vertically, Figure 7.

Cross Drilling

With the work piece mounted in the holder 90° to the axes of the lathe, spot drill the work piece with a centering drill. A view from the rear of the lathe is shown in Figure 8. After the work piece is spotted, drill the size hole that is needed. A hole is being drilled for the cross pin of a new KWM reamer in Figure 9.

Grinding, Reamers

Set your holder parallel to the axes of the lathe. Then, using a grinding wheel, grind the work parallel to the work for the length and depth. A new KWM reamer is being ground one-half its diameter and the length that is needed. Always cover the lathe with cloth or paper as much as you can when grinding to prevent grinding dust from damaging the lathe, Figure 10.

Grinding Brocot Pallet Pins

Set your holder 90° to the axes of the lathe. Then, using a small grinding wheel, grind the work for the length and one-half of the depth. I use the back end of drill bits for Brocot steel pins, Figure 11.

Note: Always use adequate ventilation, wear safety glasses. and take proper precautions when working with machines.

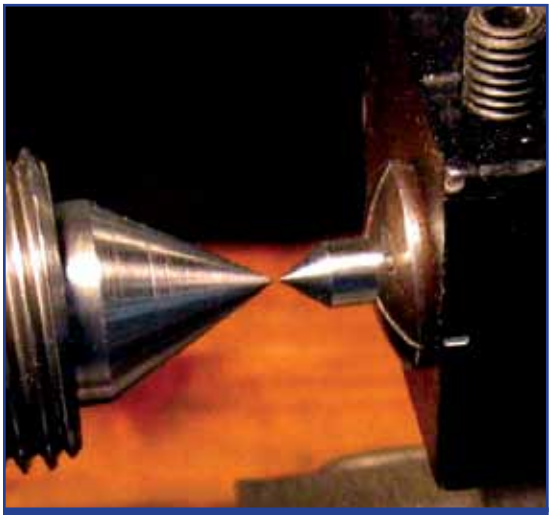


Fig. 7



Fig. 8

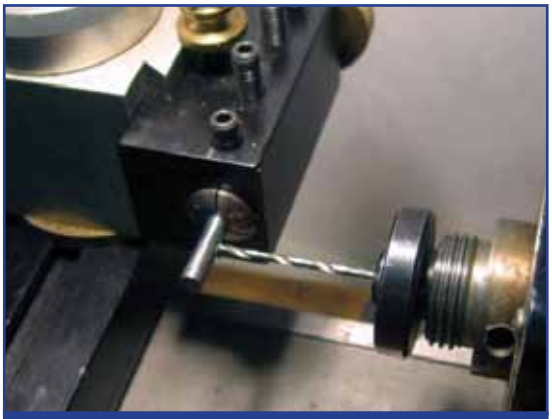


Fig. 9

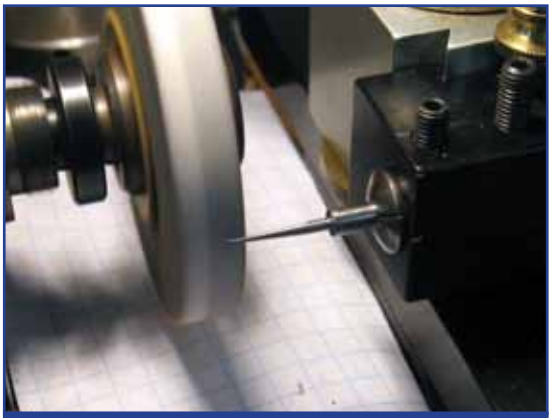


Fig. 10



Fig. 11

American 18 Size Pocket Watch Tool

By Wesley Simmons

I have done many American 18 size pocket watch overhauls—far too many to count. I have encountered a few problems during the reassembly. I have found that where there is a problem, there is also an opportunity for a solution.

The problem that presented during an 18 size overhaul is one that usually occurs in the reassembly phase. The problem is that the pallet fork must go in between the upper plate and the dial-side balance jewels. There is a simple solution to this: assemble the pocket watch upside down. I remember when I was first told to assemble watches of this size. I thought it sounded unrealistic and crazy. Of course, it turned out not to be crazy. This method works great.

Sometimes when you find a solution, a new problem presents itself. Since it's easier to assemble the watch upside down, there really is not a good way to hold the thin upper plate. It can be hard to get the plate level, which is important to the piece staying firmly in the holder. There is another problem with the regular pocket watch movement: sometimes you cannot put the dial-side plate on top, as the movement holder gets in the way.

So, the holder is the problem. The holder is also the solution. I found a way to modify a Swiss plastic pocket watch holder to fit my 18 size pocket watch needs. I have used it many times in the three years since I made it. It turned out to be a very helpful tool.

It was a rather easy fix. The movement didn't need anything extensive. I took a file to the four red plastic inserts. I filed down a little less than half into the insert and about 4mm deep. As seen in Figure 1, the movement holder's inserts are filed down to allow the plate to sit level and firmly in place.

It was only after I altered this movement holder that I found an added benefit. The amount that I filed away from the depth of the four inserts let the upper plate sit very close to the top of the movement holder as seen in Figure 2. This added a very nice benefit.

The main plate can be put on the top of the other plate and gears freely. There was no more movement holder blocking the dial-side plate from going fully down to the upper plate, as seen in Figure 3.

This simple solution has proven very effective during my 18 size overhauls. I hope it will help other watchmakers as much as it has helped me.



Fig. 1



Fig. 2



Fig. 3

SPECIAL TOOLS SECTION

THE WONDERMENT OF THE MAILLARDET AUTOMATON, Part III*

First Assessment and Start of Repairs

By Andrew Baron

In part one of this series, I described the marvelous Maillardet automaton at The Franklin Institute, as hundreds of thousands of spectators have witnessed it since its ca. 1800 debut. A dozen or so years into its public life, the Maillardet automaton was described in Brewster's Edinburgh Encyclopedia as "[the figure of] a child kneeling on one knee and holding a pen in his hand." In 1826, the automaton appeared in an engraving in what may be its original costume (April 2014 *Horological Times*, p. 15). Today, as part of the Amazing Machine exhibit at The Franklin Institute, the automaton is sans costume in deference to the purpose of that exhibit. Based on an 1802 letter from Margaret Graves (May 2014 Horological Times, p. 29), the automaton may well have been in its original clothing in the 1826 engraving.[1]



The automaton in its unrestored state, 2005.
Photo by Brian Selznick

My first real understanding of the automaton came courtesy of a set of 27 intriguing amateur photos and three brief video clips sent to me by Brian Selznick, the author-illustrator of *The Invention of Hugo Cabret*.[2] Brian captured these images during his 2005 research visit to the Institute and provided them to me as technical consultant for that book. At that time the automaton hadn't been on display for some years, and in some photos the figure's head is seen beneath the writing desk, resting on the glass cabinet top. In the video clips, the drawing hand moves spasmodically through its motions, with no paper in place to capture what would essentially have been illegible output.

My next insights came from John Alviti, The Franklin Institute's Senior Curator. John mailed a valuable set of 12 black-and-white photos depicting much of the mechanism apart for major work that was done 27 years earlier by clockmaker Joseph Balt. These were soon augmented by a fresh set of 18 professional-grade, close-up views of the assembled mechanism in its then-current state. Prepared by the automaton's long-standing exhibitor, Charles Penniman, these photos arrived marked with the legends "Lower portion of torso, rear view," "Right elbow linkages," etc. Arriving two weeks before my Philadelphia journey, these visual aids provided a welcome and deeper look at the automaton, and helped fill the vacuum of the 2,000 miles between the machine and me. Two of Charles's annotated photos depict a fractured brass retaining ring, half of which is seen affixed to the inside of the head at neck level, while the other half remains attached to gimbals at the top of the headless torso. On another photo, Charles noted a possible impingement of mechanism in the right shoulder, a condition brought to his attention by engineer-inventor Rafal Szczepanowski, son of Philadelphia art conservator Matthew Szczepanowski.

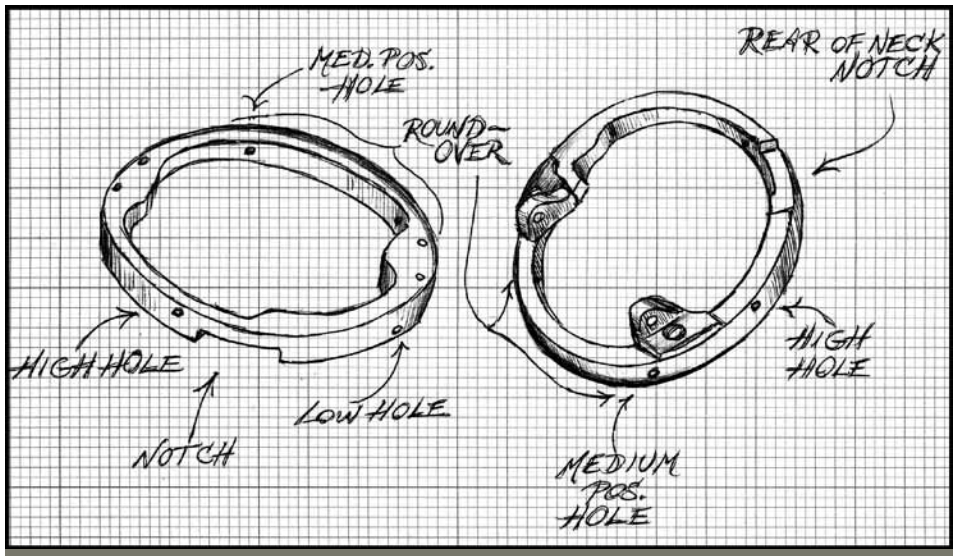
1. Sandy Powell, the Oscar-winning costume designer on *HUGO* states: "The automaton is dressed in a 16th-century Elizabethan or Jacobean style in a laced-up doublet with a ruff...probably [in] knee-length breeches. The reference to Spanish style could refer to the formality of the ruff as the Spanish were the leaders of fashion in the late 15th and 16th centuries with the very rigid-looking style."
2. Scholastic Press, 2007. For more about Brian's initial contact with Andrew, visit www.popyurs.com/hugo

*Continued from May 2014 *Horological Times* - The series began April 2014

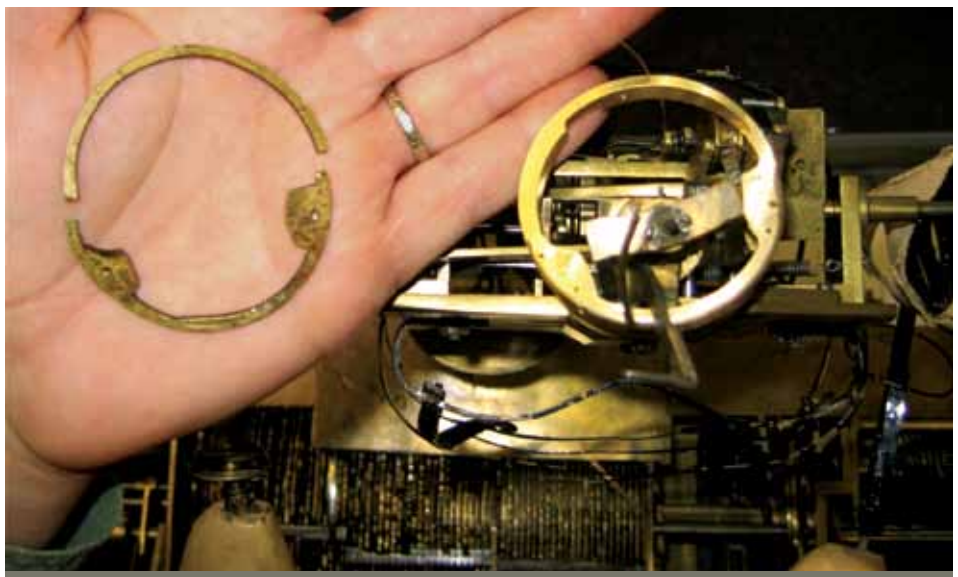
On With His Head!

The decision to bring the automaton back to life was influenced in part by the Institute's desire to feature it in the Amazing Machine exhibit, which was scheduled to open in the coming months. Ideally, it should run well enough and long enough for a professional film crew to create a short video that would accompany the actual artifact on display. As a starting point, I was asked to work on the reinstallation of the automaton's head. Significantly, it was this task and its unexpected peripheral issues that led to my discovery and restoration of the long-lost original movement of the head, and limited restoration of the eye action.[3]

The Franklin Institute's machinist, Kevin McLear, and a Bridgeport mill were available, and so it was decided that the best course of action would be to replace rather than repair the existing neck ring, which was insubstantial in relation to the mass it supported. My decision to take this route was also influenced by the five securing pins that fastened the ring inside the neck. These were originally installed at random heights that nearly breached the top and bottom of the existing ring, no doubt contributing to its weakness. Although apparently original, this detail was given less attention than the rest of the machine, perhaps being done by an apprentice.



The new neck ring was re-engineered by the author to have additional features.
Drawing by Andrew Baron



The new ring is mounted on the head-turning yoke. Cams and hands are seen below.
Photo by Andrew Baron

I engineered a thicker ring with one rounded edge, since it would have to be inserted at a fairly steep angle, and then pulled into its seated position in order to clear a connecting-rod lug soldered to the base of the neck. Likewise the taller ring would require a milled notch, in order to clear the top of that lug. I briefed Kevin on the details, leaving the fabrication in his capable hands, while I returned my attention to the main mechanism of the automaton.

Deeper Trouble

Upon close inspection, a number of issues became evident, including some that had potential to cause invasive damage. The first, a very loose spring barrel retaining plate on the rotational motor was easily remedied by tightening the plate screws. Initial attempts to operate the machine revealed a second issue that proved to be a bit more involved: A short video made just prior to the start of further work reveals the headless figure's drawing hand attempting to navigate through a portion of its programming with a pronounced, constant tremor. At one point the hand suddenly jumps upward, momentarily suspended well above its normal operating range, only to crash down a fraction of a second later and continue shakily onward in its prescribed path. The event passed too quickly to identify the cause.

3. Work on the eyes remains in progress.

Alert to the possible shoulder impingement, I kept my eye on the linkages moving about in this area as the machine was run once again, observing that operating clearances there were very snug indeed. The cause of the hesitation was soon confirmed during another rotation of the cams, when the drawing hand jumped up once again and froze completely, the heavy cam stack stopping in its tracks. A cursory look at the machine as a whole revealed an alarming sight: The hardened steel cam follower for the Z-axis drawing action had stopped with its contact tip suspended well above the cams. The visible space between the tip of the follower and the cam surface was perhaps not much more than an inch, but it looked like a mile, given that we should never witness a tip not making contact with the cams. A gentle tug on this follower immediately revealed that it was solidly locked in this unnatural position.

Moving then to the Y-axis cam follower at the opposite end, a quick check showed it to be appropriately engaged: The steel tip could be lifted off the cam manually, with just the normal counter-spring resistance. Moving now to the X-axis follower in the middle, which at first glance appeared normal, I discovered that it too was frozen in place. However, instead of being stuck in the air (an ultimately benign malfunction as far as potential cam damage is concerned), it was quite the opposite; i.e., the steel point was jammed hard into the surface of the softer brass cam, on an ascending face of one of the cam's many peaks. Ultimately, this short span of 1.75mm thick, inclined brass took the full impact of the stoppage, arresting the inertia of the entire counter-weighted cam stack, and the combined forces of the powerful quad-mainspring, tandem rotational motor.

I quickly followed the connecting rods from the tail ends of the jammed cam followers up the figure's back and out to the shoulder top. There it was plain to see that an X-axis crank, employed by the drawing hand's lateral mechanism, had swung around and firmly pinned the upper end of a Z-axis link in the figure's upper arm, back against the rigid brass framework of the inside of the shoulder. The momentary sliding friction of the interference wrenched the Z-axis follower up from its cam and froze the X-axis follower in place, ultimately preventing its tip from freely traversing up the cam slope as the stack rotated under it. With both sets of associated linkages locked, inertia was no longer an issue, but the stack remained arrested under mainspring pressure, concentrated at the point where the X-axis follower tip was impacting the cam.

Desiring to alleviate the strain on the cam and liberate the followers posthaste, I located each point of attachment of both affected linkage circuits, from the follower tails down in the machinery's cabinet up to where the interference manifested at the shoulder. The X-axis linkage would have to be parted in order to liberate the impacted Z-axis link, thus releasing both. Disassembly required removing a thick shoulder back plate, after which it was a simple task to disconnect a direction-changing lever that joined a rod coming up the back of the figure from the X-axis crank at the shoulder.

Establishing Failure Modality

Clearly, the Z-axis connecting rod in the upper arm should never have been operating so closely to the X-axis crank at the top of the shoulder, such that the crank could catch and impact it into the shoulder plate, to say nothing of plowing a cam follower tip into a cam. When running the machine, the hazardous proximity of the crank and Z-link wasn't at first apparent, and the dynamic interplay of all the linkages presented an elegant sight. It only became a problem when the X-axis crank was in its far right rotation (drawing arm at the figure's far right) at *the same moment* as when the Z-axis link was nearest the crank (specific vertical position of the drawing hand).The fact that the first attempts to operate the machine didn't result in total lockdown[4] demonstrated that this unhappy juxtaposition was at its most vulnerable state only during momentary coincidental combinations within specific programs, when a particular cam pairing placed the crank and link most at risk. Moderate looseness in the drawing arm joints, from two centuries of countless demonstrations, may also have contributed an element of randomness to an already unstable condition.

Which component was at fault? As first glance, the brass upper end of the drawing arm's Z-link appeared to have a natural-looking, almost graceful compound curve. It was a rear-facing aspect of this curve that would occasionally move into the operating area occupied by the continuously oscillating crank as the automaton progressed through a program. The heavier construction and workmanlike look of the X-axis crank made it clear that nothing had been altered there. However, the relatively more delicate construction and, upon closer inspection, slightly oppressed look of the Z-axis link made it suspect.

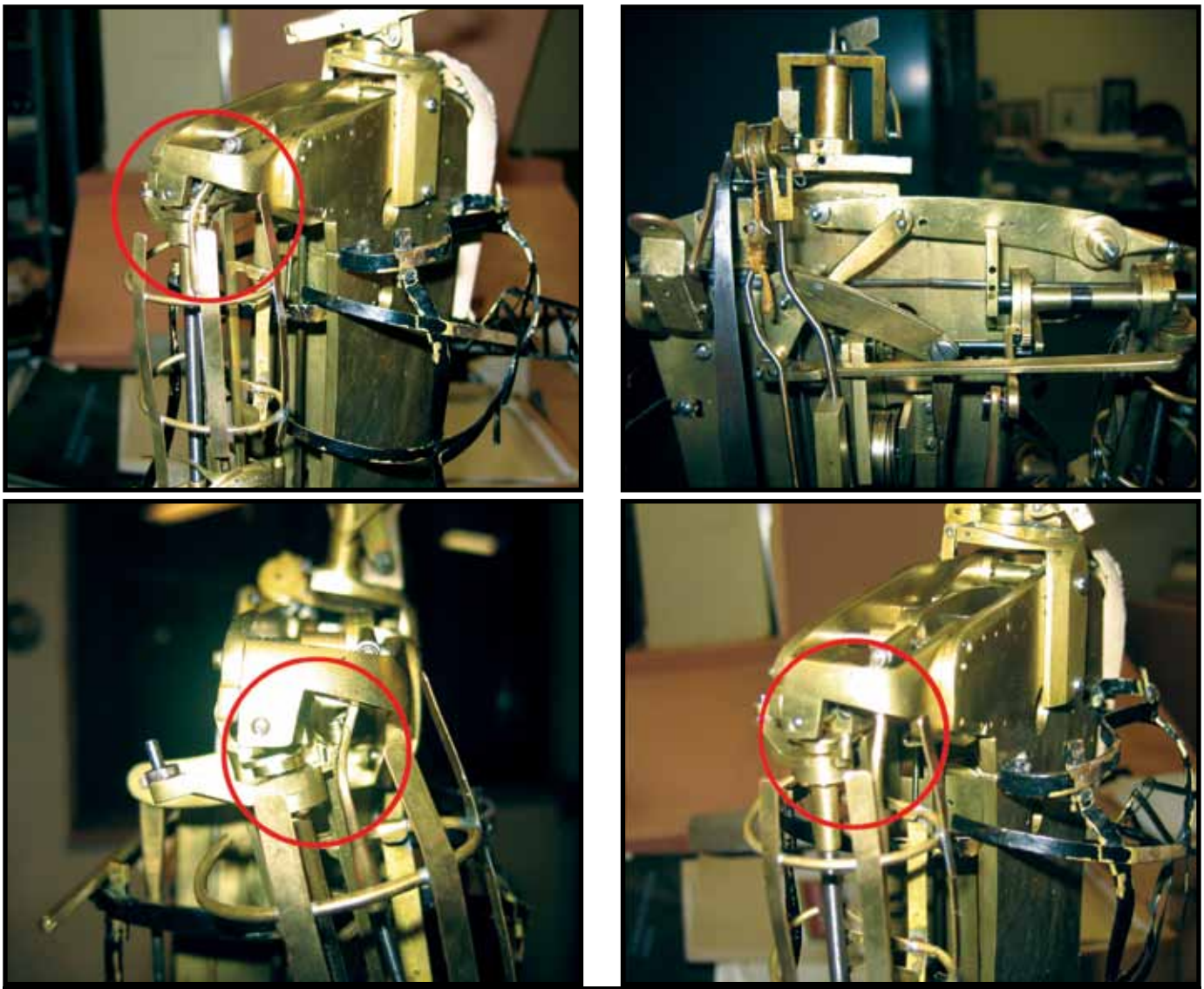
How did it get this way? Even with careful planning, there are always inherent risks in handling delicate artifacts. As later explained to me by Charles, the automaton's drawing arm might have been impacted during an intermuseum loan. In retrospect this makes perfect sense. The Z-axis connecting rod in the arm, as with most of the automaton's linkages, consists of a straight steel shaft with shaped brass ends. Damage in this case, i.e., a mild buckling of the softer brass end of this Z-axis link, would be the logical result of the automaton's hand being thrust upward by an external force beyond its engineered range of motion.

Anchored to the forearm at its bottom, and secured at the top by a rigid connecting lever, the upper arm's Z-axis link had nowhere else to go under this

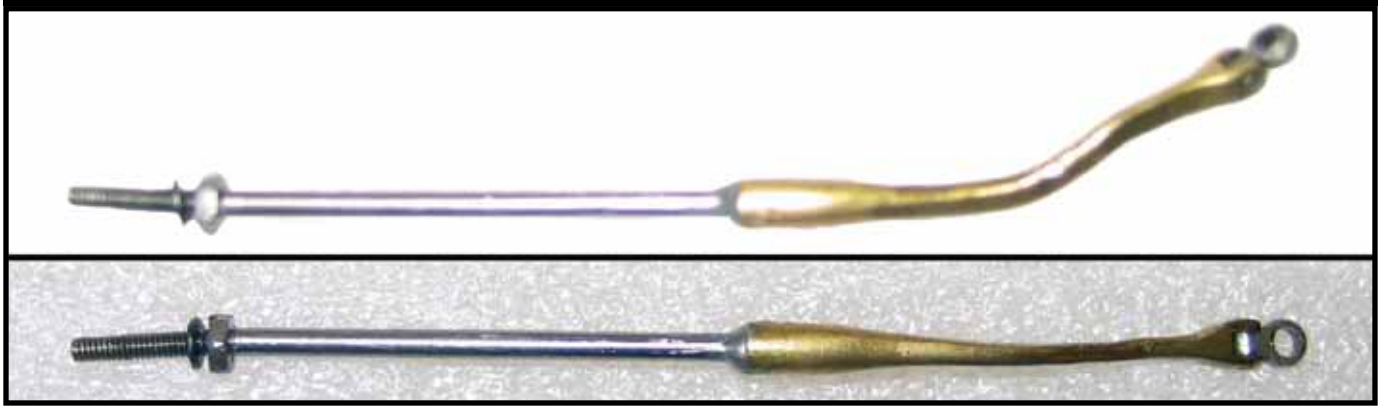
4. Prior occasions in which total stoppage likely occurred became evident, as we later discovered.

circumstance but shorter in length. If the link end could be appropriately reshaped, it should remain clear of the crank. However, if the link were made too straight, it might strike the interior front of the shoulder frame during the drawing hand's forward excursions. Clearly, it had to operate without interference, within a limited, defined area as the drawing arm moved about.

Since it at first appeared that the front shoulder frame would interfere with forward movement if the link end was remade straight, I made only a mild correction.



Shoulder Linkage Corrections: clockwise, from top left; as found—an accident waiting to happen; rear shoulder plate removed for linkage disassembly; Z-Axis link after first correction; after final correction.
Below: link as found (top), and after final corrections (bottom).
Photo by Andrew Baron



Upon reassembly, this proved insufficient. It then occurred to me that a narrow, slanted channel, milled into the interior front of the thick brass shoulder frame, could accommodate the forward-most excursions of the link, although no such feature was outwardly evident. My supposition was verified soon enough, however, when, looking up from below, my pocket flashlight illuminated the interior of the thick brass frame. There, unmistakably, on the underside interior surface was the very channel I had envisioned.

Resolution

From this moment, it was clear how to proceed. I removed the link once more, and this time carefully straightened it almost completely in one plane, recognizing that the other orientation of the compound curve was engineered to tuck under the shoulder structure. I reinstalled the link and made a static test of the range of motion by gently pushing the automaton's arm forward at the elbow, against light counter-spring pressure until it stopped. This, and a visual crosscheck with the flashlight, confirmed that the maximum excursion of the straightened link could be easily accommodated. Now, running the automaton under its own power while watching the linkages move about in the shoulder, it was clear that right action had been taken. It was satisfying to observe that the operating clearances remained more than adequate to prevent further trouble of this nature, regardless of which program was in play.

For the first time since my arrival, it would now be safe to attempt a drawing. So with a pen placed in the automaton's hand and paper on its desk, and more than a little anticipation, we began. A few turns of the winding crank through the trapdoor on the right side of the cabinet added more power to the rotational motor, and a few more turns through the door on the other side energized the transverse motor. With a brief lift of the starting lever, the governors spun up to speed, the cams slid into position and began to turn, the drawing arm moved over the paper, and the automaton began to draw.

Next installment: The automaton's own drawings will help us analyze and resolve issues that will lead to a vast improvement in the fidelity of its output. We'll then delve into the century-old puzzle and reclamation of the long-lost graceful head motion.

The Maillardet Automaton—How It Works



Seventy-two brass cams that store data for the drawing hand, plus two cams that control the head and eyes, reside inside an ornate chest upon which the figure is mounted. All 74 cams rotate in unison while only five are in play at a time: a selected trio for the hand, plus a dedicated pair for the head and eyes. The cam stack is bi-directional; rotational and lateral, each direction being governed by a dedicated motor with fusee drive and an endless screw, centrifugal fly. Seven different poems and drawings are created by three to four subsets of cam trios, depending on complexity. Thus, 9 to 12 cams render each selection. The cam stack is subdivided into three sections, each dedicated to one type of movement. Facing the figure, a cam follower on the left controls fore-and-aft (Y) movement of the drawing hand, the center follower controls lateral (X) movement, and the right follower controls lift (Z).

Cam Rotational Action

The rotational motor on the right has tandem spring barrels, each containing two stout mainsprings. As the cam stack rotates, the engaged cam trio imparts vertical motion to the pivoting cam followers, which otherwise remain stationed at their respective locations over each section of the stack. The head and eye cam duo activates two additional followers on the far right. As all five followers steadily navigate the undulations of the cams passing beneath them, long connecting rods attached to their aft ends transmit the undulations to the upper torso. Here, each vertical connecting rod branches off to its respective destination; head, shoulder, elbow and forearm, where the motions are converted to tilt and rotation of the head, and lift, lateral and fore-and-aft movement of the drawing hand. The eyes and eyelids are activated by secondary mechanism, originally having vertical, lateral and convergence capabilities.

Cam Lateral Action

The single mainspring, lateral motor on the left aligns the selected cam trio via a drum and helix that engages a pulley wheel at the left end of the cam arbor. When the last of seven selections in the automaton's memory is completed, the entire cam stack is motor-driven all the way to the left until it stops with the first selection cued up under the followers, ready to begin again.

Automatic Motor Switching

Two to three times per drawing, the cam stack comes to a momentary stop, and the cam follower tips are propelled upward onto lateral steel runways, safely clear of the undulating cam surfaces. At this point the rotational motor switches off, automatically triggering the lateral motor to run for about two seconds. The cam bank then glides one position to the right, aligning the next trio of cams under the followers. The lateral motor then switches off and the rotational motor resumes. When the last trio of a given poem or drawing has run its course, the automaton brings its hand away from the drawing and looks up, and both motors automatically switch off.

BASELWORLD 2014

By Jack Kurdzionak, CW21, FAWCI

"AWCI's friends at Witschi, Bergeon, Horotec, and Greiner are always asking about the Institute and its members, and send their best wishes to all."

Baselworld, the world's largest, and one of the most prestigious, watch and jewelry trade shows was held this year at the end of March in Basel, Switzerland. This was a record-setting event.

According to their post-show press release, "Baselworld 2014 came to a close today having once again succeeded in bringing together around 150,000 attendees from every continent. Baselworld is the ultimate meeting place for the entire industry with all sectors represented: watchmaking, jewelry, diamonds, gemstones and pearls, machines, and supply industries. The eight-day annual event, where around 1,500 exhibitors, including all the leading brands, from over 40 countries first showcase their innovations and novelties. On top of that, the economic impact is enormous. The Swiss watch industry, 95% of which is represented at Baselworld, had exports of around 21.8 billion Swiss francs in 2013. And it is not only the watch and jewelry industry that benefits; the whole of Switzerland profits, as Baselworld directly and indirectly generates an income of around 2.4 billion Swiss francs a year and thereby approximately 13,000 jobs."

This was my 21st visit to Baselworld, and I have to agree with the above press release that this was a record-setting show. Baselworld's annual attendance continues to grow as it utilizes the newly constructed building completed in 2013. Just a few years ago Baselworld attendance actually declined to around 90,000 as the world economy tanked and watch and jewelry buyers stayed home. Even with the world economy in disarray, Baselworld management made the decision to demolish a major building and replace it with a far larger one. Subsequent events have confirmed their confidence in the future of the Swiss watch industry. This year's exhibition attendance would have totally overtaxed the old facility.

Swatch Group's decision of about a decade ago to phase out the sales of watch movements to other Swiss brands appears to be paying dividends to both Swatch Group as well as the Swiss watch industry in general. Each year Swatch Group dedicates a higher percentage of its movement production to its own brands and less to those of competitors, which has resulted in some major industry changes. For the first time since the industry shakeup of the 1980s, new, mass-produced movements from new manufacturers are coming to the market and finding their way into some major brands. You will be seeing mechanical movements from Sellita, and mechanical and quartz movements from Soprod in brands that customarily used those from Swatch Group's ETA movement division. High-end manufacturers such as Girard Perragaux are developing their own specialized calibers and were proudly displaying them at Baselworld.

"Mechanical watch movement development is not remaining static."



A watchmaker working on a new caliber from Girard Perragaux

Ronda's wide array of quartz movements are now used in numerous Swiss watch brands that formerly featured ETA movements. Quartz movements from ISA are also gaining market share. A few years ago, some observers complained that one company would come to dominate the Swiss watch industry, but now it seems that the industry is actually growing in health, market share, and size with a new emphasis on the research and design of new movements, both mechanical and quartz.

Don't ask me how they do it, but a couple of Swatch Group brands, Hamilton and Mido, are now featuring newly minted mechanical movements with a 60-hour power reserve on the chronograph and an 80-hour power reserve on an auto calendar movement. Since I only spoke with sales reps who could describe the features, but not the technical details, I can only present my observations as seen through the display backs of the cases combined with the sales pitch. The movements appear to be derivative executions of the venerable ETA7750 chronograph and the ETA 2824-2 automatic date. The balance had no regulator, and the upper balance shock absorbers were not incabloc. There were some sort of inertia blocks on the balance wheel, presumably for regulation. These movements will be used in the higher-priced models of both Mido and Hamilton brands. Last year I saw a new ETA 2824-2 derivative Tissot caliber with the hairspring coiled in the opposite direction of that used in the base model. Will material for these specialized new model movements be available to the trade? We will need more information to be able to answer those questions. One thing is certain. Mechanical watch movement development is not remaining static.



Our friends at Witschi

> "The industry is actually growing in health, market share, and size with a new emphasis on the research and design of new movements, both mechanical and quartz."

This year, I was accompanied by Dave Kurdzionak, my son, who owns a watch sales and service center in Massachusetts. While Dave spent considerable time with various watch brands, I naturally gravitated to the tool and equipment building to visit the various well-known suppliers. Bergeon had several new products and their representative, Gérard Meulensteen, was kind enough to take some time to show them to me. One was especially intriguing. They call it an "Adhesive cleaning and handling swab" (ref. 7007-21 and 7007-22). These small swabs, which resemble our Q-tips, have a paper-based staff with some type of polyurethane tip that will lift dirt and dust from a dial without leaving any mark whatsoever. They are also adhesive enough to lift a delicate polished watch hand without marking the hand. They are washable and reusable and certainly have a use when watchmakers are fitting dials and hands. AWCI's friends at Witschi, Bergeon, Horotec, and Greiner are always asking about the Institute and its members, and send their best wishes to all. If you ever have the opportunity to go to Baselworld, the tool department needs to be on your must-visit list.

As any visitor to Baselworld will tell you, Baselworld itself is not a vacation destination. It is hard work from morning till evening, and the fair is so large, it is impossible to see it in its entirety in eight days.


A watchmaker's bench at Bergeon



Adhesive cleaning and handling swab from Bergeon

After getting an overview of Baselword, one needs to visit the vendors that are most relevant to one's needs. At each day's end, there is time to relax by meeting with friends and associates outdoors at the main entrance where there are refreshments and entertainment available for the attendees to unwind after a busy day. Someone even had a chauffeur-driven Excalibur car waiting near the front door. We decided to take a break on Sunday, which is often the day with the highest attendance, and visit Mount Pilatus in Lucerne via its aerial cableway and gondola. The ride to the 6,982-foot summit on a gorgeous spring day was well worth the time and expense to be there. Switzerland is a beautiful country, and every serious watchmaker should spend some time there. Later on Sunday evening we visited with a Swiss friend and his wife, who invited us to their home for a Swiss raclette dinner. That was a great change from restaurant food even though the food in Swiss restaurants is always good.

Before we departed, I paid a visit to Horia SA, the maker of some very fine Swiss watchmaking tools, to make arrangements to buy a new toy. There are so many fine toys for watchmakers in Switzerland, it is often difficult to decide which ones to buy. The toy of the year for this watchmaker is the Horia jeweling tool (ref. PO 61-01-04) with a complete set of pushers and stumps (ref. AS 04-04). It has arrived, and I can tell you without reservation that it is the best jeweling tool I have ever owned. Its multiple uses include pushing out balance staffs without damage to the balance wheel, fitting a pallet arbor perfectly, and even tightening cannon pinions. Of course, one cannot visit Switzerland without returning with the obligatory large bag of Swiss chocolate for friends and relatives. It serves the dual purpose of making those people who have not been to Switzerland happy, and using up any extra Swiss cash in the wallet.

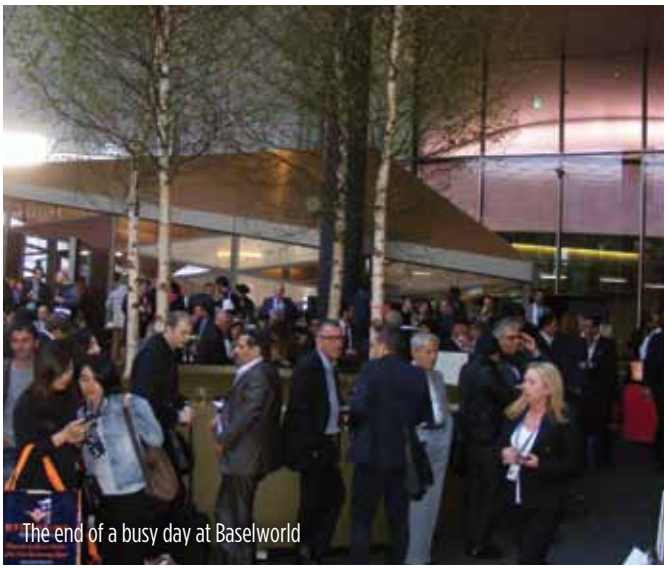
If you ever decide to make a visit to Switzerland, regardless of whether it is to attend Baselworld or just do some sightseeing, and need some Swiss travel tips, please do not hesitate to contact me at jackkurdz@gmail.com.


Mount Pilatus in Lucerne


A singer entertains the crowd as they relax outside of Baselworld.



Excalibur reproduction of a Mercedes


The end of a busy day at Baselworld

Sit on Your Hands: Horology Q&A

In the May issue of *Horological Times*, we posted this question:
You are presented with a watch for repair that you know is beyond your abilities. What do you do?

Here are some of the responses we received.

Turn it down and try to assist the customer in finding someone who can do the work.
-Watch & Clock Service & Repair

I say, "This watch is beyond my ability. Can I find someone to service this for you?"
-Tim Rogers

Turn it down and assist in finding a person with the correct certification.
-Rob Gamber

Offer to find a watchmaker with appropriate skills to repair the watch. I would then offer my time to that watchmaker so that I could learn from them as the watch is repaired. If possible.
-Benjamin Howe

I give the watch owner the name of a repairer from a list of specialized work I cannot do. Saying, "I can't repair it properly" or " I have no experience in this" is appreciated and remembered. These same customers often return with other work I can do. To be honest with and know oneself reduces repair troubles and sleepless nights over a lifetime. Be careful of the exotic work that comes in and tempts you. Manage customer's expectations and your risk to an honest level. *Most of all remember to have fun.*
-Robert Mohr

The Next Question

Most watchmakers and clockmakers fill multiple roles in their businesses. Though their main contribution to the business's bottom line in a retail setting might be bringing in revenue by doing repairs, they can also add value in many other ways. In light of this, what methods do you use to measure productivity in your workshop?

Please submit your response to answers@awci.com by **June 12.** Or join us on facebook—www.facebook.com/MyAWCI, and www.facebook.com/horologicaltimes, where we will post the next question the first of every month. If you haven't liked *Horological Times* yet, do it now!

You can also look for the next question in the email newsletter, which goes out the first week of every month. Your name will be entered in a drawing to win a prize from our grab bag of horological treasures.

CONGRATULATIONS to **Rob Gamber**, who won our prize for his answer to May's question.
Gruen Watches, A Special Collection and *The Time Museum Historical Catalogue of American Pocket Watches*.



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A History of the American Watchmakers Institute

The second installment from *A History of the American Watchmakers Institute* details the development of the Horological Institute of America, which grew into a powerful national organization of watchmakers, with 2,800 members by 1959, including a Japanese chapter.

The Horological Institute of America

World War I awakened interest in precision timekeeping and focused attention on the responsibility and importance of the watchmaker in the social, industrial, and economic world. It emphasized, moreover, the increasing scarcity of competent watchmakers in America. Magazine articles in *The Keystone* and other publications, as well as many private discussions, campaigned for a national conference to analyze the shortage.

H. E. Howe, chairman of the Division of Research Extension of National Research Council in Washington. DC spearheaded the organization of a national meeting to be held in Washington, DC, May 19-20, 1921. Every branch of the jewelry and watchmaking industry, the American National Retail Jewelers Association, the Smithsonian Institution, the US Bureau of Education, the US Bureau of Standards, the Federal Board for Vocational Education, and many press representatives were represented at this important meeting.

Informal discussions examined the many problems facing the horological industry: the shortage of competent watchmakers, the need for stabilizing and standardizing repair techniques, education and certification to improve the quality and reliability of repairs were only a few of the matters under consideration. The enthusiasm for a plan of definite action was high. A committee was appointed to formulate an organizational plan and draft a constitution and bylaws.

On October 20 and 21, 1921, the organizing committee met at the headquarters of the National Research Council in Washington, DC The organizational plans were discussed and approved and the Horological Institute of America (HIA) was formally established. Those present were:

> Webb C. Ball, Webb C. Ball Co., Cleveland, OH; Dr. A.L. Barrows, National Research Council, Washington, D.C.; Dr. A. F. Beal, U. S. Bureau of Standards, Washington, D.C.; John J. Bowman, Director, Bowman Technical School, Lancaster, PA; J. A. Freund, Waltham Watch Co., Waltham, MA; Ferdinand T. Haschka, Tiffany & Co., New York, NY; Edward H. Hufnagel, President American National Retail Jewelers' Association, Mt. Vernon, NY; A. B. Jacobson, C. D. Peacock & Co., Chicago, IL; Frederick P. A. Jennings, New York State Retail Jewelers' Association, Albany, NY; W. L. Jones, President, West Virginia Jewelers' Association, Martinsburg, WV; C.F. Kleinfelter, Federal Board for Vocational Education, Washington, D.C.; Edward F. Lilley, Dean, New England Jewelers' Institute, Milford, MA; William H. Manby, Hamilton Watch Co., Lancaster, PA; E.A. Marsh, Consulting Superintendent, Waltham Watch Co., Waltham, MA; Paul Moore, Secretary, Division of Research Extension, National Research Council, Washington, D.C.; W. Calvert Moore, Editor in Chief, Keystone Publishing Co., Philadelphia, PA; Robert F. Nattan, Jewelers' Circular Publishing Co., New York, NY; Ingild Povelsen, U.S. Naval Observatory, Washington, D. C. ; George w. Spier, Merchant and Manufacturers' Jewelers Association, Washington, D.C.; Samuel Swartchild, Chicago, IL; Alfred G. Stein, Patek-Philippe Watch Co., New York, NY; William R. Zesinger, South Bend Watch Co., South Bend , IN; and James H. Noyes, Jewelers' Security Alliance, New York, NY.

Just as the New Yorker Uhrmachers Verein (which had operated approximately 55 years earlier) had done, the new HIA group recognized the necessity of helping watchmakers improve their skills. However, the new organization also based its program on a systematic schedule of horological examinations to

certify that the benchman had truly developed certain abilities. It was decided to issue certificates in three classifications: the highest title to be known as "Certified Horologist," the next grade as "Certified Watchmaker," and the third level to be known as "Certified Junior Watchmaker." (It was decided to drop the "Certified Horologist" category in subsequent meetings.)

The election of officers was then held. Those elected were: George W. Spier, president; E.H. Hufnagel, first vice-president; Webb C. Ball, second vice-president; John J. Bowman, treasurer, and Paul Moore, secretary.

In reporting this auspicious occasion, *The Keystone* stated: "While the Horological Institute of America was originally started as a subsidiary of the National Research Council, it was decided by the 24 members in attendance at the first meeting to incorporate it as a separate institution. It will, however, have the benefit of cooperation from the National Research Council, the US Bureau of Standards, the Smithsonian Institution, and a number of other important scientific and governmental agencies. It is also felt that leaders in the jewelry trade will see great advantages to be derived from active support and cooperation in this movement."

The new HIA was off to a healthy start. Membership grew steadily. The Association's goals of improving the industry's status by education, publicity, and certification of technical skills was vigorously supported by concerned governmental agencies as well as by many allied industries such as the American Retail Jewelers Association and the railroads. Acting President E.H. Hufnagel (who was also president of the American National Retail Jewelers' Association) visited 24 southern cities to speak to jewelry groups on behalf of the HIA. He stated "that he found great interest in the plans of the Institute among the jewelers and a growing realization that it was necessary for them to cooperate in the movement to help remedy the scarcity of watchmakers."

W.C. Donnelly, General Supervisor of Time Services for the Baltimore and Ohio Railroad, stated that he would like to see every watchmaker under his jurisdiction take the HIA Certified Watchmakers Examination.

The benefits of unification were beginning to show for America's horological industry. Following the fifth Annual Meeting in Washington, DC in 1925, the entire delegation accepted President Coolidge's invitation to visit him in the White House. The 1925 meeting also marked the beginning of acquisitions for a horological museum. Several antique watch and clock items were donated to the HIA at this meeting.

The first step toward establishing an endowment fund came about the same time, as George W. Spier, HIA's founding president, decided to bequeath the sum of $10,000 to the Institute. He stated that he made the donation "to show my gratitude to America for what it has done for me and mine. And likewise to honor and dignify the profession which has carried me safely over the bridge of life."

In the preparation of this history, it has been somewhat difficult to maintain chronological continuity in the affairs of the Horological Institute of America. There is a logical explanation. While moving the HIA office in 1954, numerous files and documents were packed and placed on the street curb for the movers to pick up. Unfortunately, a trash truck made its appearance before the moving van arrived! We have reconstructed the following highlights from available material:

The first issue of the *HIA Journal* was published and distributed to the membership during October 1934. The issue was mainly a reference volume giving information about the Institute, its regulations, and a listing of certified watchmakers. The plans called for the *Journal* to be published quarterly.

The HIA's 15th Annual Meeting in Washington, DC in May 1936 was particularly significant. It marked the beginning of discussions suggesting close cooperation between the HIA and the Untied Horological Association of America (UHAA). The latter was the only other national horologist group in the US at the time. Mr. Frank Foegler, president of the UHAA, brought the greetings of his association to the meeting and presented plans for cooperation between his group and the HIA to be considered by the Advisory Council of the Institute.

"6.7 percent of the applicants failed to pass the requirements established by the Committee. Most of the failures were due to improper balance and hairspring work."

As an outgrowth of Mr. Foegler's appearance, a joint meeting of the Executive Boards of HIA and UHAA was held April 23, 1937 at Cincinnati, Ohio. The joint assemblage elected Fred G. Gruen as its chairman and Orville R. Hagans as secretary; UHAA applied for, and was accepted, as a Sustaining Member of HIA.

The HIA's certification program made much progress over the years. In a report presented during the 1938 Annual Meeting the chairman stated: "Since the beginning of the HIA, the Certification Committee has received 1518 applications for Junior Watchmaker and 743 applications for Certified Watchmaker Certificates. Of this number 1332 Junior and 596 Certified Certificates have been granted, 6.7 percent of the applicants failed to pass the requirements established by the Committee. Most of the failures were due to improper balance and hairspring work."

The clouds of World War II were beginning to gather as the HIA celebrated its 20th anniversary during the Annual Meeting in Washington, DC in May 1941. The Capitol City faced the potential danger of enemy air raids upon it. Because of this threat, the Institute

thought it best to move the Packard Collection to a safer place in the central part of the United States. The watches were placed in the custody of Frank D. Urie, vice-president of the association. He supervised their transfer to the Museum of Science and Industry in Chicago, IL.

Before the collection was moved, the individual watches were examined for any deteriorating conditions that might affect their operation. This check-up period made it possible for the entire collection to be photographed in color by J. S. Rogers of Garrett Park, MD. Color movies were made of the tourbillon, the skeleton watch, and the musical alarm watches. Phonograph records were also made of the musical alarm watches as they chimed.

During World War II, HIA discontinued their annual meetings. The Advisory Committee met when necessary to conduct business of the Institute.

The annual meetings were resumed on May 25-27, 1947 when the Institute gathered again at the National Academy of Science in Washington, DC to mark their 26th year of service to the horological industry. The momentum lost during the war layoff was quickly regained. A large and enthusiastic attendance marked the annual meeting in 1948. The HIA Executive Committee held a joint meeting with the Canadian Jewelers Institute Board of Governors in Niagara Falls, Canada on October 11, 1949. The benefits of an organized approach to problems in the horological industry were beginning to be recognized throughout North America. The HIA held its 1950 annual convention in conjunction with the Canadian Jewelers Institute at Dearborn, MI. The HIA and the US Bureau of Standards were honored by the US Olympic Games Committee in 1952 by being named as official co-inspectors and testers of watches to be used in timing the US Olympic trial events.

During 1953, one of the giants of the industry retired. William H. "Uncle Billy" Samelius had served both the HIA and the UHAA on their educational and technical committees for many years. He held honorary memberships in many state watchmakers associations and had taught students from all parts of the world as director of Elgin Watchmakers College at Elgin, IL.

HIA's influence spread overseas as 21 people received their CMW certificates in an impressive ceremony held in Osaka, Japan on July 6, 1957. One hundred Japanese watchmakers from the HIA affiliate chapter were to become charter members of the new American Watchmakers Institute when it was founded in 1960.

HIA grew into a powerful national organization of watchmakers. By 1959 it had 2800 members and 20 guilds including the Japanese chapter. Certification and the dissemination of technical information remained the foremost functions of HIA throughout the years. These concepts were so important that the HIA brought them along to serve as a cornerstone for the building of the new national organization, The American Watchmakers Institute, when it was founded in 1960.

"HIA and the US Bureau of Standards were honored by the US Olympic Games Committee in 1952 by being named as official co-inspectors and testers of watches to be used in timing the US Olympic trial events."

Horological Institute of America Officers

Presidents

George W. Spier	1921-1924
Ed Hufnagel	1924-1935
H. Babcock	1935-1940
Howard Beehler	1940-1944
Frank D. Urie	1944-1950
Alfred S. Rowe	1950-1953
Howard S. Schrantz	1953-1956
Richard W. Slaugh	1956-1958
Raymond F. Soucie	1958-1960

Secretaries

Paul Moore	1921-1931
Ralph E. Gould	1931-1951
Forrest E. Peters	1951-1954
Arthur F. Beck	1954-1959
Harold K. Calvert	1959-1960

Note: the HIA merged with the UHAA to become the American Watchmakers Institute in 1960.

Affiliate Chapter NEWS

George McNeil's Potomac Guild (A Guild of the Horological Association of Virginia)

During the April meeting, Joe Jabbour presented his continuation on the "Clock Appraisal: Understanding Fair Market Value, the components of an appraisal and the expectations of Insurance companies, lawyers, and the I.R.S." He provided more details about what makes an appraisal useful to all clock owners for estate planning, donations, insurance coverage or just to know. He continued attendance of The NAWCC Clock Appraisal Course and shared his experiences and knowledge obtained during the course.

For the May program, Jeff Meizlik gave a demonstration on reverse painting (black and gold) on the lower glass to allow a viewing window for the pendulum bob. The Guild always includes a show-and-tell, the 50/50 drawing, and any material wants/needs. Meetings are generally held the first Tuesday of the month at the Fairfax City Senior Center in Fairfax, VA with dinner at 6:30, meeting at 7:15, and program at 7:45.

Officers

President: Joe Jabbour
Vice President: John Enloe (Acting)
Secretary: Barry Boling
Treasurer: Dick Riegel

Minnesota Clockmakers Guild (MCG)

Mr. Phil Wright, of The Tower Clock Company of Ohio, restored the Ft. Snelling Tower Clock at the Fort Snelling State Park (located in the heart of the Twin Cities). He gave a private MCG viewing in the Ft. Snelling Historic Site, Thomas C. Savage Visitors Center on Wednesday, May 14, 2014 at 7:00 p.m. His talk to MCG was about the steps and process of the restoration. They were able to view the works before it is installed in the Headquarters Building.



During show-and-tell at the April meeting, Garth Antila shared his restored vintage Jaeger-LeCoultre Automatic watch.

Future MCG Meetings Topics

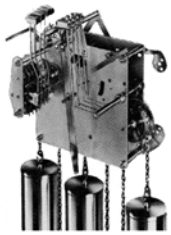
June – No meeting is planned
July 10, 2014 – TBD

Two road trips are being planned for this summer: Bily Clocks, Museum, Spillville, IA and Jim Borden, Woodworks Clocks, La Crescent, MN.

MCG Officers

President: Richard Zielike,
Phone (952) 938-0681
Email richard@edinaclock.com
Treasurer: Garth Antila
Phone (715) 386-3575
Email 3mgarth@gmail.om
Secretary: Dean Ziegenbein
Phone (952) 322-4776
Email dpz72@hotmail.com

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Cody Anderson	AL	Joseph Munda	NC
Andrew Baron	NM	Ken Perales	TN
Russell Bartmes	IL	Eugene Pronko	VA
Troy Carlisle	TX	John H. Quinsey	AL
Stephen Carpenter	OH	Kasturi Rangan	UK
Alan Chernomashentsev	FL	Manuel Real	CA
Olivier DeBoel	MI	Gabriel Reyes-Filion	RI
James Dutton	FL	Mike Riggins	OH
Kenneth Edmondson	TX	Anthony Rydell	NY
Steven Finkelstein	NJ	Moshe Shimko	TX
John Flahive III	WI	Joel Simon	TX
Martin Gorman	OK	Phillip N. Smilie	AL
Scott Harlow	WA	Brandon Spencer	KY
Froilan (Allen) Laygo	NC	Dan Watts	IN
Col. Daniel Lee	FL	Roland West	MO
Vincent Light	UK	Walter Wire	SC
Joseph Matthews	CA		

Congratulations!

to our members who have recently passed the **CW21 exam**

Paul Nichols	IL
Daniel Pedroso	FL

In Memoriam

Richard L. Dorer	TX
Stephen Kowalsky	NY
James L. Leazer, CMW	CO



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