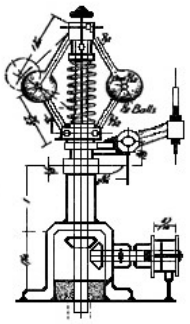

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

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Club Business

Rich Baker

Club Elections. NEMES elections were held at the June meeting. Dan Eyring was elected President, Victor Kozakavitch for Vice President, Rich Baker for Treasurer, Todd Cahill for Secretary, and Steve Cushman for Director. Bob Timmerman will be the NEMES Gazette editor and Jeff DelPapa will be the NEMES Gazette publisher.

Online Store. The NEMES Online Store is now live, and you can order NEMES apparel and pay your dues from the comfort of your living room. The link is available on the www.neme-s.org.

NEMES Apparel. We have NEMES denim button down shirts, t-shirts, and sweatshirts for sale. The denim shirts $35, sweatshirts $25, and the t-shirts $15. Order online or contact Rich Baker at 978-257-4101 if you would like to order one.

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NEMES July Meeting

The NEMES July meeting will be a tour of the Spencer Organ Company, located at 38 Yetten Terrace, in Waltham. They are a small organ repair and rebuild company that repairs pipe organs, and builds new wooden pipes for organs. They retune organ pipes, and "re-voice" them as well, which means adjusting how the pipes sound. We will see their shop, which is a fairly well equipped wood shop, as well as how they repair and retune pipes.

Yetten Terrace is a small, private road, a short distance from the intersection of Pine Street (the road to the Embassy Parking Lot) and Newton Street (the main cross street. Parking is limited at that location, but it is about ½ mile from the Embassy Parking Lot. The preferred way to get there would be to park in the Embassy lot, and walk: turn left out of the Embassy lot, walk down Pine Street to the end (intersection with Newton Street), and turn right onto Newton Street. Take the next immediate left, and walk up Yetten Terrace. Driving directions would be similar. Repeat, parking is limited.

Update on Howard Gorin

Howard is out of the restrictive leg "boot" that required him to use a walker, and now has a less restrictive leg brace that allows him to use his own shoes. He is now walking on his own (albeit slowly) without the walker. He has resumed many of his normal activities.

We wish him progress in his recovery.

President's Corner

Dan Eyring

First of all, I want to thank you all for giving me a chance to lead the Club and possibly making it a better experience for the membership. That's a tough order, because the Club is in very good shape thanks to the great efforts of past and current officers and members. I DO have some ideas and priorities, which I will try to convey in this article and others coming up in future months.

But first, perhaps you would like to know my qualifications to be NEMES President. Sadly, other than enthusiasm, the answer is slim and none. I am neither a machinist nor a mechanical engineer - though I have ambitions in those directions.

Based on family history, one might expect I would have taken up the mechanical trades. Grandpa number 1 was an Ohio blacksmith in the late 1800s who walked to Buffalo, NY and set up a shop making horse shoes and nailing them onto horses' hoofs. When cars came along, Grandpa and his eldest son Chris converted to a successful auto repair business, supporting a family of 7 for many years. After Grandpa retired, Uncle Chris took up teaching Machine Shop at a Buffalo vocational high school.

As for Grandpa number 2, he was a rum runner during Prohibition, smuggling Canadian moonshine across Lake Erie into the States. Looking for a more stable and laudatory career, my Dad got a mechanical engineering degree from Cornell and went to work in the weapons shops at Bethlehem Steel for the duration of WWII.

Perhaps the one hundred hour work weeks Dad put in all through the war knocked the stuffing out the mechanical gene that he might have otherwise passed on to me in 1951. In any event, this apple didn't fall anywhere near the tree, instead rolling downhill and ending up a few orchards away. I was interested in electronics as a kid and ended up as a "System Engineer" working in the "Military – Industrial Complex" for 40 years, the last 25 at Draper Lab in Kendal Square. I recently learned about a year ago the Norm Jones and I were working in the same Honeywell plant in Lexington at the same time back in the '80s. Who knew??

What is a system engineer?? Basically, it's a job found mostly in the defense industry and refers to somebody who doesn't know what he wants to be when he grows up. You end up knowing a lot about many trades – but not enough to do anything, except write proposals and manage projects.

When I started out in 1975, we worked with things called transistors which you soldered into things called circuit boards. When I retired a few years ago, electronic components had gotten so small and circuits so complex that you pretty much had to take the word of the electronic designer that there was something actually there. So, my goal for retirement was to learn a useful trade, make cool stuff and hang it on the wall, or where ever. Anyway, I decided to build a shop and learn how to use it. It's a work in progress.

So enough about me. My first priority for making a difference in the Club is finding new (and younger) members.

When I joined NEMES back in 2010 or so, my addition to the Club did little to reduce the average age of the membership. I don't really know what it is, but I speculate it is somewhere in the 70s. The total experience and expertise represented by that statistic is a wonderful and rare resource. It would be a shame to see it eventually vanish because there are few younger members coming into the Club.

The Maker movement that Jeff DelPapa is so involved in is an excellent way for NEMES members to engage with the younger technical generation. The STEAM Expo coming up at the Newton Library on July 15th will have Maker and similar threads going on. I encourage NEMES members to attend and exhibit, hopefully getting teen and college age youth interested in what we do and maybe also in joining the Club.

Another way to engage the younger generation would be to make connections with vocational technical schools in the local area. One of the largest is right in Waltham and Museum Board member Bill Nolan has strong connections there. I have asked him to make some introductions with the school administration - with the possible results of advertising NEMES to the students, offering our meeting and meeting venue as a place for students to come and demonstrate what they are making, going into the school shop to show some of our members' work and so on.

Another way to engage may be via the Museum's educational outreach, under the direction of Rudy Ruggles. Rudy is generally working at the grammar school level, but hey, it's never too early to capture a kid's fascination. Perhaps, on a rotating basis, a NEMES member could go with Rudy on school visits and talk to school kids about the technical world that exists beyond twitter and the iPhone.

Well, I'm running long here. Thanks for listening. Next month I would like to start a virtual discussion about increasing member participation in things like making contributions to the NEMES Gazette. See you then!

Dan

Shop Hints and Kinks

An occasional column on ways to do things a little easier

Removing metal slivers and splinters from your hands:

I have found that an Xacto knife with a #11 blade (the one that comes to a very sharp

point—some other manufacturers call it a #1 blade) is very useful for getting splinters and metal slivers out of your hands

The sharp point can get under the splinter or sliver, allowing you to lift it out.

Sometimes it takes several tries. I keep these in several of my toolboxes, and also one in my car. I was reminded of the usefulness of them when I have to use the one in my car to remove a metal sliver acquired at a Museum work session.

Bob Timmerman

NEMES is exhibiting at an upcoming event, and we would like you join us.

STEAM Expo at Newton Free Public Library

On July 15, 2017, from 12:00-3:00 pm, the Newton Free Library will be hosting it's second annual STEAM Expo as part of their ongoing programming for all ages related to the STEAM (Science, Technology, Engineering, Art and Mathematics). The Expo is a gathering of tech enthusiasts, traditional crafters, artists, musicians, educators, tinkerers, hobbyists, engineers and students.

I urge NEMES members to both attend and exhibit and get involved in the rebirth of Do-It-Yourself. This is also (maybe mostly) a great event for kids, so bring them along.

NEMES members will set up outside, so all forms of engines (air, steam, IC, heat, etc.) will be allowed. We should plan on bringing our own air compressor, along with a hose manifold. I have asked for three tables for NEMES exhibits, please let Dan Eyring (daneyring@rcn.com) know as soon as you can if you plan to attend.
Exhibitors will be able to temporarily park in front of the Library to unload, then move their vehicle to the large parking lot next to the Library.

The Library is located
at 330 Homer Street, Newton, MA 02459
(617) 796-1360.

Detailed directions are available at http://www.about/.newtonfreelibrary.net/

From the Editor's Desk
Bob Timmerman

Dan Eyring moved up from Gazette Editor to President. I was nominated to take his place, so I am the new Gazette Editor. Norm Jones will be helping out with programs.

I am a little new to editing, have never done desktop publishing, and am trying to do the job in Word 2016, which is not great for desktop publishing. I may not get all the formatting right in the first few issues, and might switch programs later on.

A little about me. I am a mechanical engineer with side interests in machining and in history of technology. I had a slight amount of machine shop training as an undergraduate at Cornell—we had a 2 semester required course in machine shop. First semester was production tools: turret lathes, automatic screw machines, thread rolling machines, etc. They had a number of these machines in the lab we could watch in action. Second semester was universal machine tools: engine lathes, milling machines, surface grinders, etc. We ran those machines, and I still have the gear I made in that course. I have some machine tools in my basement shop, and use them for small projects. I have yet to make anything sophisticated, but I have hopes of doing so. If I have any competency in a manual trade, it is as an electrician, as a result of a lot of theater lighting work I have done over the years. Most recently, I rewired the Delta 14" drill press in the Museum.

My career has been in the field of Applied Thermodydamics and Thermal Systems. Translated, this is design of power plants, refrigeration systems for air conditioning, and the like. I am a Registered Professional Engineer, a legal requirement for designing systems that affect public health and safety, such as power plants.

I have the same goals as other Gazette editors: to edit ***your*** contributions. I went back to the first Gazette. Here is what the first editor wrote, in issue 001: "The newsletter is to communicate with the members, so we have to have something to say, which means you have to contribute or we won't have anything to say." Dan Eyring wrote more or less the same when he took over the Gazette. I am not going to repeat that. Dan sometimes reprinted articles from old Gazette's to fill space. I am not sure I agree with that policy—you can read the old Gazettes on line, so maybe we don't need to take up paper to print reruns. If you do not contribute, some months we might have a very small Gazette.

I plan to introduce one or two new features in the coming months, as we have contributions. The first one is Shop Hints and Kinks, drawing upon your experience with little ways of doing a job a bit easier.

Events

This section covers the next three months. See the NEMES website for months later than that.

The Yankee Steam-Up at the Rhode Island Museum of Steam and Wireless is not yet listed on the Website, but it is usually in early October.

July 2017

8&9 July The 25th. Annual Long Island Antique Power Association Summer Show 5951 Sound Avenue, Riverhead N.Y. 11901 www.liapa.com

Featuring 25 Years of Preservation All Feature Events From The Past Will Be On Display

Show Times Are From 10am To 5pm Both Days Saturday Night Dinner

July 16 STEAM (Science, Technology, Engineering, Art, Mathematics)Expo, Noon—3 PM, Newton Free Public Library,330 Homer St, Newton, MA 02459.
Detailed directions at http://www.
about/.newtonfreelibrary.net/

15-16 July Zagray Farm Museum Summer Show and Swap Meet
Colchester CT 544 Amston Rd., Rt. 85 north from Colchester, 1-1/2 miles on right.

Contact: Ed Bezanson, 85 Dayton Rd., Waterford, CT 06385 860-208-2422
email: edwin_c_bezanson@sbcglobal.net
www.zagrayfarmmuseum.org

July 28-30 22nd Annual Eliot Antique Tractor and Engine Show
Eliot, ME
Feature: Minneapolis-Moline tractors; Jacobson engines
From 1-95 take Rt. 236 N. 5 miles to RT 103, left 1/4 mile, show grounds on right
Contact: Lisa or Tom Raitt, 2077 State Rd., Eliot, ME 03903
207-748-3303
email: info@raittfarmmuseum.org
www.raittfarmmuseum.org

August 2017

4, 5, & 6 August The Northeast Rockbusters will be hosting another Antique Equipment Show in Connecticut in 2017!!

@ Mark Gluck's farm in Plainfield CT. More to follow

August 18th, 19th, 20th Bristol Society of Model and Experimental Engineers Model Engineering Show

Thornbury Leisure Centre in Thornbury, Gloucestershire
England http://www.bristolmodelengineers.co.uk/

12-13 August Straw Hollow Engine Works Show

Pine Ridge Farm, Cross St., off Rt. 70.
Boylston, MA

Contact: Daniel Moore, 125 Linden St., Boylston, MA 01505; 508-869-2722.

19-20 August Antique Marine Engine Expo
75 Greenmanville Ave Mystic CT
1-95 exit 90, south on CT Rt. 27 to Mystic Seaport.

Contact: Scott Noseworthy, PO Box 6000, Mystic, CT 06355 860-572-5343
email: scott.noseworthy@mysticseaport.org
www.mysticseaport.org

September 2017

8-12 September 46th Annual Dublin Engine Show
Dublin NH East of junction 101/137 on Rt. 10t
Feature: Vertical engines.

Contact: Bart Cushing, PO Box 668, Walpole, NH 03608 603-313-9970
ernail: bart@cushingandsons.com
www.dublinnhgasenginemeet.com

13-17 September Tobacco Valley Flywheelers 37th Annual Show
Haddam CT
Haddam Meadows State Park, Rt. 154.
Contact: Russ Bengtson, 646 Bear Hill Rd., Middletown, CT 06457
860-347-5774
www.oldengine.org/members/tvf

22-24 September 33rd Annual Connecticut Antique Machinery Assn. Fall Festival
Kent CT
1 mile north of Kent on Rt. 7.
Contact: John Pawloski, PO Box 425, Kent, CT 06757 860-927-0050
email: j.a.pawloski@att.net
www.ctamachinery.com

The Lombard Water Turbine Governor Part 1: Comparison of steam and Water Turbine Governors

Bob Timmerman—From a writeup prepared for the Charles River Museum

The Lombard Water Turbine Governor was designed to regulate the speed of water turbines of the Francis type, where the water flowed inward from the periphery, and exited at the center of the turbine. These turbines were designed for moderate flows and heads, typical of the operating conditions encountered in New England mills. [For high flows and low heads, the Kaplan propeller turbine is used, while for very high heads at low to moderate flows, the Pelton turbine is used) Control of flow through the Francis type of water turbine differs from a steam engine, because the steam engine uses a relatively small flow of steam under high pressure, while the Francis water turbine uses a relatively high flow of water. A nominal 100 hp non-condensing steam engine using steam at 150 psi would require a 3" steam line, while a water turbine with the same power output, operating at the 17 foot head of the lower canal system in Lowell would require a 36" water inlet pipe.

There are two ways for the governor to control the speed of a steam engine: operating a throttle valve which regulates the flow of steam to the engine, or regulate the amount of steam admitted to the cylinders by adjusting the travel of the valve gear. Valve gear regulation was more efficient and but more expensive than throttling, so was used when economy was more important than initial cost—larger engines, and those running more hours per year.
Throttle valve control of a steam engine is shown in Figure 1, below (this is a photo of a display in the Museum collection):

Figure 1: Steam Engine Throttle governor
The belt turns the vertical shaft, which causes the red balls to rotate. Centrifugal force causes the balls to move outward, moving further outward as the speed increases. The pivot for the balls is anchored at the bottom, so the outward motion of the balls causes the vertical shaft to *drop*, which closes the valves in the green painted enclosure.

Figure 2: Steam Engine Valve Gear Governor

Valve gear regulation of the speed of a steam engine is shown in Figure 2 (above, again from the Museum collection):

The flywheel is painted red, and revolves with the engine crankshaft. The governor weight is inside the flywheel, and is painted yellow. As the speed increases, the weight rotates outward. Movement of the weight is resisted by the spring attached to the weight and the flywheel. Movement of the weight shifts the position of the eccentric, seen behind the flywheel, painted red. Shifting the position of the eccentric changes the amount of steam the valve gear admits to the engine.

Both of these methods of regulating the speed of a steam engine are compact, and fairly simple.

By contrast, the amount of water that has to pass through a water turbine requires a more complex regulating mechanism. A cross section of a water turbine, c 1891, is shown in Figure 3: (Next column)

A series of vanes are arranged along the periphery of the turbine, which direct water onto the turbine rotor (indicated in the cut by the concentric circles connected to the main vertical shaft at the center of the picture.). Water flows through the vanes, onto the rotor where it is decelerated and gives up it's energy to the rotor, and exits down through the center of the rotor. The vanes are rotated by the arms attached to the vertical shafts attached to the vanes. These levers are actuated by the linkage that is turned by the sector gear, and the sector gear is rotated by the pinion and the vertical shaft at the left of the picture. All this machinery takes a fair amount of force to operate, far more force than can be developed by the simple flyball governor.

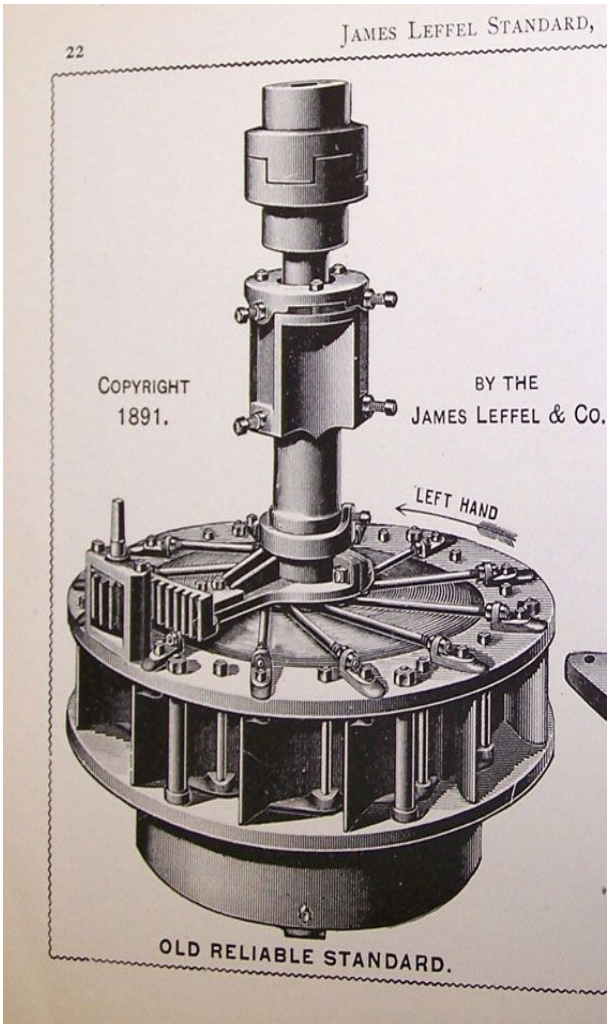

Figure 3: Typical Francis Water Turbine

A *servomechanism* is necessary to amplify the small force developed by the governor to obtain the large force needed to move the guide vanes. The Lombard Water Wheel Governor is one such device.

The Charles river Museum has one in their collection, and the construction and operation of it will be described in the nest few issues.