



The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

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November 2005

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Editor's Desk

Victor Kozakevich

I received a last minute addendum regarding Dr. Phillips' presentation at the next meeting and would like to offer it here.

His research focuses on validating one of the precepts of the Theory of Relativity related to the measurement of the gravitational constant. In his lab he has constructed an apparatus to do this measurement which is largely mechanical with some optical components. It is an interesting device that bounces a steel cylinder vertically on rails. Within the cylinder are some optical components that are mounted on 2 masses. In operation, a laser is pointed into the bottom of the cylinder as it bounces. It bounces and gives up a gravity measurement every 1.3s. The interference patterns generated on the laser beam allow the measurement of the gravitation constant to one part in 10¹³. Noise generated in the ball bearings that attach the payload to the rail limits the accuracy. Air rails would likely improve this figure but would be expensive; a lower cost alternative is preferred. Tolerances are on the order of 0.001". Jim will show pictures of the apparatus and discuss how the air rail system should be constructed. Time will be given to question and answers.

Vic

Next Meeting

Thursday, Nov. 3, 2005

7:00 PM. Meetings held at:
Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Membership Info

Annual dues of \$25 (via checks made payable to "NEMES" and mailed to our membership secretary) for the calendar year are due by December 31st of the prior year. See the last page of this Gazette for a membership form.

Missing a Gazette? Send mail or email to our publisher.

Addresses are in the left column.

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President's Corner

Norm Jones

The Meeting

The November meeting will feature a dual program. Al Goldberg will be presenting a slide show featuring the steam engines that once occupied the low service building at the Chestnut Hill Pumping Station. Al's program was originally scheduled for the September meeting but had to be rescheduled due to a lack of time on that evening. The second speaker will be Dr. James Phillips from The Center for Astrophysics at Harvard University. Dr. Phillips will be speaking about the construction of a piece of precision lab equipment that he has designed for measuring gravity. See the Editor's Desk on page 1 of this issue for details on Dr. Phillips' talk.

Yankee Steam-Up

One of my favorite antique machinery shows takes place at The New England Wireless and Steam Museum in East Greenwich, Rhode Island. Judging by the number of fellow NEMES members that I met there, it is one of their favorites as well. The show was held this year on October 1st with perfect weather. Pictured below is fellow member Ray Hasbrouck with his steam powered bicycle.



Annual Cabin Fever Bus Trip

It's time to think about Cabin Fever once again. A short conversation with anyone who has attended the show in the past will convince you that this is one of the premier events of the year. Our bus trip presents a great opportunity to get better acquainted with your fellow club members, not to mention the luxury of not having to drive yourself to York Pa. in the middle of the winter.

The Cabin Fever Expo will take place on the weekend of January 21-22 2006. This year's bus fare will be \$110 per person, based on 26 riders. If you are unable to make the trip for any reason, refunds will not be extended this year under any circumstances. The trip will be canceled if less than 26 people sign up. A maximum of 40 riders allow us to reduce the cost per person. Fare reduction is based on the number of people that sign up.

As in the past, we will leave from the Riverside T station in Newton Mass on Friday morning January 20th. The Holiday Inn on Arsenal Rd in York Pa. is the only hotel that the bus will be servicing. Room rates are \$60 + tax per night. You can share a room with someone to make the trip more affordable. We will be staying there on Friday and Saturday nights. Please make room reservations in advance by calling (717) 845-5671. You must mention that you want the: New England Model Engineering Society Cabin Fever Expo rate of \$60 when reserving a room. Those of you who wish to travel independently are eligible for the same rate.

We will be going to the Old Country Buffet (same restaurant that we went to last year on Saturday evening) for dinner on Friday evening after checking in at our hotel. This is voluntary and not prepaid.

Sign up at the November meeting or call me at (978) 256-9268 if you would like to go on the trip. Non NEMES members are invited to join us as well. Please send a check for \$110 made out to "NEMES", to our treasurer: Richard Koolish 212 Park Ave Arlington Mass 02476-5941. The deadline for bus reservations is January 1 2006. More details to follow next month.

See you on November 3rd

Norm



The Meeting

Max ben-Aaron

The October meeting

The October meeting of NEMES was held in the Jackson Room of the Charles River Museum of Industry. Ron Ginger, Founder and Venerable President Emeritus, described his odyssey down the canals of Ontario and New York State, with emphasis on the engineering aspects of canal construction.

After he retired, Ron wanted a boat. Although he had built boats in the (distant) past, Ron decided to buy a boat. After much research, his choice was an Albin27. He found one for sale in Ottawa, Canada and purchased it. Bringing it home to Maine entailed a journey down the Rideau and Trent-Severn canals in Ontario to the Great Lakes, and then down New York states canal systems to New York city and up the coast to Maine. He kept a log of his 2000 mile journey, which can be found at his website: <http://www.plsntcov.8m.com>

The first leg of the trip was a traverse of the the Rideau Canal. Opened in 1832, it is the oldest continuously-operated canal system in North America.

The plan to construct a navigable waterway between Lake Ontario and the Ottawa River was conceived after the War of 1812 - the war where Canada beat back the invading Americans. Naval shipyards at Kingston were critical to Canada's defense, so a secure supply route from Montréal to Kingston was critical to any war effort. After the war ended, it was revealed that the Americans had been hatching a plan to cut off access to the St.

Lawrence. Naval strength has always been a major issue for the British Empire, and the Rideau canal was conceived to provide a secure supply route from Montréal to Kingston, avoiding the vulnerable St. Lawrence River route.

In 1826, Lieutenant Colonel John By, of the Royal Engineers, was assigned to supervise the construction of the canal. Colonel By faced a stiff challenge, to create a navigable waterway between the Ottawa River and Kingston, through a wilderness of rough bush, swamps and rock terrain, funded by an incredibly tight-fisted British Government.

Actual construction of the Canal started in the spring of 1827, and five years later, in 1832, it was completed. To build a slackwater system, several dams had to be built to hold back the water and flood part of the system to navigable water depths. One of the largest of these was the dam proposed for Hogsback Falls. It was to be 45 feet high, which was considerably higher than the largest similar dam built in the U.S. at that time, which only stood 28 feet. It also had to be built across a fast flowing river, an engineering feat with few precedents. The Rideau Canal is a major triumph of engineering and remains one of the greatest engineering feats of the 19th century. The Canal has worked well since 1832, and looks like it will work well for the next several centuries.

Ron had heard about the hydraulic lift on the Trent-Severn waterway for years but never saw it, so it was a major reason he planned the trip home that way. It has the largest lift lock in the world, one of only a very few, mostly in Europe. The lock, completed in 1904, is a spectacular example of late 1800 engineering.

At the lift, Ron struck up a conversation with the lock-keeper, Ed Donald. When Ed heard of Ron's interest in mechanical works, he gave Ron a very fine inside tour so Ron was able to take detailed pictures which he used to illustrate his talk. These can also be viewed at Ron's web-site: <http://www.plsntcov.8m.com>

Ed explained all the controls in the main control room. From this room the lock-master is able to remotely latch and unlatch the gates at each end of both the moving chamber and the canal, and he can operate the transfer valve to allow water to move

from one ram to the other, controlling a high pressure pump to add water to either side.

The lift has two lock chambers, each mounted on its own hydraulic column. Guide rails keep the chambers aligned so they don't tip over. The rails look rather light but the loads are, surprisingly, light because everything is perfectly balanced - the liquidity of water ensures that the load is always distributed uniformly. Thanks to Archimedes' Principle, it does not matter if there is a big boat on one side and a little one on the other.

At any time one lift box is at the top and the other is at the bottom. The two rams are cross connected by a pipe with a control valve; when the valve is opened the higher box comes down, the lower one goes up. Without any extra water the system would come to rest with both chambers half way. This is not what you want to happen! So the upper chamber is filled with one more foot of water than the lower one has so that its ram lags by a foot all the way up, and extra water must be allowed in from the higher canal to compensate. One foot of water in this chamber weighs 130 metric tons.

The end gates that allow entry to the tubs hinge down, like opening a truck tailgate. The main latch pins that open the end gate are about 3" square pins, driven by a hydraulic motor through rack gears. Each gate seals against a rubber pad, surprisingly tightly. Even so, there is slight leakage from the higher canal when its chamber is down.

Ed took Ron in an elevator down to about ground level to show him the main power room with the electrical service panel and the two electric pumps for balance adjustments of the main rams. These are the two electric motors driving 10-stage water pumps to supply make up water to trim either ram. In the winter, both rams are let down. When spring comes, it takes many hours for these pumps to fill the rams to reactivate the lift

The east tower has a water accumulator with a weighted top, which acts as a make up pressure source. After a roof leak, water got into the chamber and rusted it out so the reservoir was removed and is out for service. It will be lowered back through the roof when the

roof is replaced, so at this time, the only source for makeup water is this pair of electric-motor driven pumps, a much slower process.

Tanks containing high-pressure nitrogen act as a backup in the event of a total electrical failure - they can keep the hydraulic controls for the gates under pressure long enough for one safe opening.

At the top of the ram there is a small round hole that provides access to allow inspection inside the ram. Inspections are made a few times a year. Maintenance-men need breathing tanks inside the ram because it is so long and unventilated. (I wonder what they did in the days before scuba equipment).

As a machinist, Ron thinks about making parts, so he contemplated the ram – cast in sections, each section about 4 feet long. There is an internal flange for bolting the sections together, with a copper gasket between each section. This was made in 1904. Think about the machining accuracy needed so those pieces go together straight and tight.

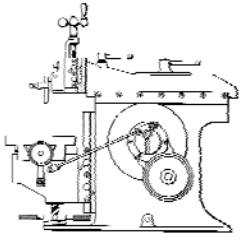
The packing gland at the base of the ram is a conventional flax packing – 9 layers – with a plastic ring above it to compress it. Frequent application of a big wrench keeps the packing tight.

The main control valve is a butterfly valve operated by hydraulic cylinders. It used to be operated from long control rods down from the tower above but in 1965 it was converted to electro-hydraulic control. Electric wires from the control room operate solenoids that control hydraulic flow to operate both the transfer valve and the gate's opening and latching. There are limit switches at the top of the valve to signal when the valve is at the 10% and full open position to reduce shock loads - they open the valve slowly then close it slowly as it reaches the end of its travel.

The description of the Trent-Severn lifts were the highlight of the talk, from the engineering point of view. The talk was up to Ron's usual standard of excellence and was informative and enjoyable. If you wish, you can vicariously experience the salacious details of the entire odyssey on Ron's web-site.

<http://plsntcov.8m.com/Albin/TripLog.htm>

Max



Shaper Column

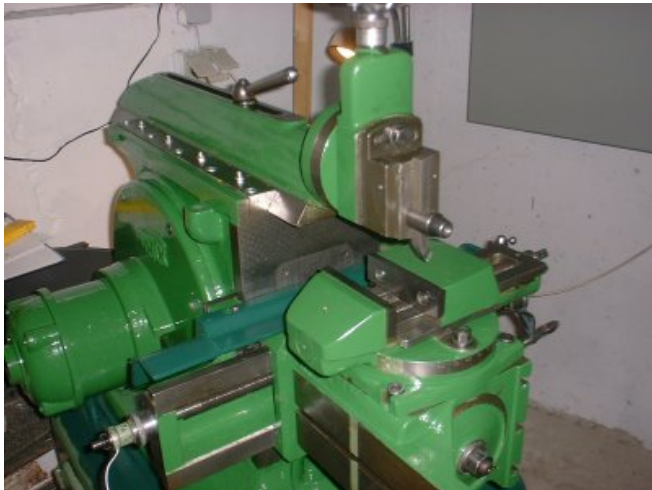
Kay Fisher

Ludwig Gack Shaper

This month's shaper story is about the refurbishing of a German shaper made by the Ludwig Gack Machine Works company. The following is pretty much a cut and paste from the owner's excellent web site and article at:

www.schmidt.ath.cx/mechanik/stossmaschine.shtml

The translation from German to English was done by Andreas Miler and it is with the author Siegfried Schmidt's generous permission that we have the following story:



Ludwig Gack Shaper Photo by Siegfried Schmidt

"My newest acquisition is a horizontal shaper, also named "Schnellhobler" or "Kurzshobler" (quick planer or short planer). By definition, these names are wrong, because for a planer, the work piece moves not the tool itself.

My Type 152 shaper, built by Ludwig Gack Machine works in 1952 is still going strong, even though it has 52 years on it now.

Other information on this manufacturer is quite rare. The only other online sources are hidden over the great pond.

The following link is an outstanding homepage on the restoration of another Gack Shaper,

different from mine. It goes into depth with pictures and movies. On the accessories pages, you get an idea of what was done with these machines.

www.csparks.com/Gack/index.xml

If someone knows about my machine or has literature and documentation, please contact me at siegfried@schmidt.ath.cx. I'd be happy to receive any tips.

Dismantling

I bought the machine blind, in a severe attack of iron deficiency. I had no clue about size, weight, nor did I have an idea how to move this piece of iron into my basement to reassemble it there. I had quite a nervous feeling during transport and loading/unloading of the machine.

Below is a photo from the Internet ad for the machine. When I finally saw the machine, my impression was a little bit more favorable.



Photo from web ad

Photo source unknown

When the machine and I touched home soil, all the doubts had faded away. The machine was secured in a more serious way during transport. The guy who gave his trailer to me muttered when I asked him for two additional load straps. In his words, two were quite enough to bend the aluminum body of the trailer.



Shaper Arriving Photo by Siegfried Schmidt

To move the top heavy shaper out of the trailer and onto the ground without a crane proved the biggest problem of the whole transport. After unloading, a sigh of relief gave me the feeling that this had been the hardest part of the whole operation.

The vise and tool head were the first dismantled parts that went into the basement. Quite heavy, but somehow the shaper didn't get much lighter.

The motor which is attached to the gear was the next part I took off. Here, I found screws in top condition. All the hardware was reused later on!



Gear under Motor Photo by Siegfried Schmidt

Grease wasn't in short supply for this machine, for sure! A clump of a few centimeters and these nice grapes had accumulated in the machine during the past 50 years. In every hole, I found grease. Very good, so the rust had no chance at all.



Less Vise & Clapper Photo by Siegfried Schmidt



Grease Not Rust Photo by Siegfried Schmidt

After removal of the crank and of the base, the single heaviest part, the machines body, remained. Screwed on two by fours, a sled was formed to get

the machine downstairs. As a gliding aid, corrugated cardboard was used. Getting the machine down was no problem afterwards.



Base on Sled Photo by Siegfried Schmidt

The base itself includes no parts of the machine, except the two switches. It's made of 6mm thick steel plates. Therefore, it's quite light. I used the sled approach again.

The electrics of the machine were altered quite often. The only thing still original was the black overload protection. The gray switch to the left was added later on and the white switch is a switch for the Dahlander motor, which can be set for two operation speeds.

The rest of the electrics were in a grim condition. It was a mix of wires, massive and flexible, held together with luster terminals.

The Motor can be driven in two directions with two speeds. It needs three-phase power."



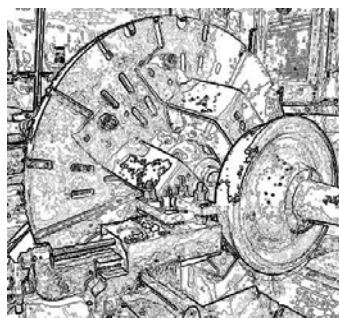
Base Photo by Siegfried Schmidt

Next month we will continue with the rework of Siegfried Schmidt's Ludwig Gack Shaper.

Keep sending me email with questions and interesting shaper stories. My email address is:

KayPatFisher@Yahoo.com

Kay



Shop Hints

Dark Surface Finish for Brass

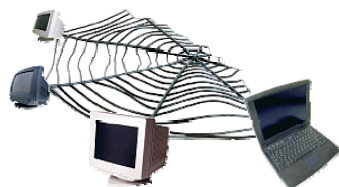
I bought a \$20 bottle of liquid concentrate from Caswell (tel. 315-946-1213) for darkening brass. The application was to put a dark finish on a brass model lamppost. It is called 'Flemish Grey' and is for all Cu alloys. It works. It leaves a dark brownish-black surface finish. One simple routine that is effective is a 3-min immersion of the cleaned brass part, at room temp, in a 10% aqueous solution. After a water rinse and drying, the surface of the part is covered with a somewhat powdery coating. This

rubs to a shine. The finish will not scratch with a light fingernail rake, but will with moderate pressure from a scratch awl. Surface finish coats, for protection or luster, can be either auto wax or any regular clear lacquer if one wants a gloss finish, or hi-temp clear lacquer (from NAPA et al) sprayed on in 2 light coats if one wants a matte finish.

If the immersion time is cut down to 1 min, the brownish finish comes out a bit antiqued with the surface showing a slightly mottled (a la color case hardening but less dramatic) appearance, with red and blue tints just visible when the part is turned under a light. Clean brass bullet cartridges make good test pieces for trying variations of time, temperature, and concentration.

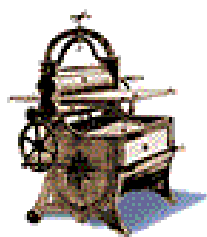
This product is a phosphorus- and selenium-containing solution that is pale sky-blue. It looks like some other similar brass blackening products sold for amateur gun work and for hobby use, but for me seems to work better. Caswell claims that their product is chemically different from the others.

Contributed by Martin Feldman



Web Sites of Interest

Sign up for the NEMES mailing list at:
<http://groups.yahoo.com/group/nemes>



NEMES Gazette Editorial Schedule 2005-2006

Here are the closing dates for Gazette written contributions in the coming months:

<u>Issue</u>	<u>closing date for contributions</u>
December	11/18/2005
January	12/23/2005
February	1/20/2006
March	2/17/2006
April	3/24/2006
May	4/21/2006
June	5/19/2006



For Sale

Shaper Work CD

Put out in 1944 by the New York State education Department this 326 page manual is chock full of valuable tips and information on using the King of Machine tools....The Shaper. Covered is everything you need to know about the care and feeding of the shaper, use of the shaper, even how to sharpen tools for the shaper. Scanned and saved in Adobe Acrobat format. The CD now has a lot more info on it, and the price has increased accordingly. \$10.00, shipping included.

Errol Groff
 180 Middle Road
 Preston, CT 06365 8206
errol.groff@snet.net

Van Dorn Valve Grinder / Refacer



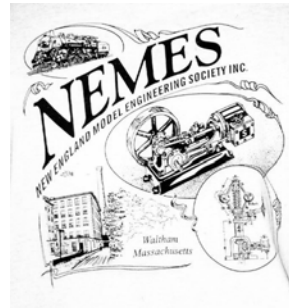
This is an older unit but still works fine. It has a collet to hold valves up to 9/16" and is adjustable in many ways. The valve holder is marked for 30 degree to 60 degree valve angles. It comes with a 1/2 HP Westinghouse single-phase motor. The bellows is worn but otherwise the unit is in good shape. I was planning to turn this into a tool sharpener but never got around to it. This tool has many possibilities. \$50. Contact Bob 603-472-2237 or neidorff@ti.com

American Optical High Power Metallurgical Microscope



This microscope has four objective lenses: 4X, 10X, 20X, and 50X. Combined with the body lens and the 10x eyepieces, this gives extremely high magnification. Focusing is by

two concentric controls, for fine and coarse. It has a large table that moves XY with easy rack controls. The headpiece and eye pieces are Nikon. A metallurgical microscope is different from a biological microscope in that lighting is provided through the lenses, using a built-in illuminator, rather than from below. It needs a serious cleaning but works as is. Everything moves smoothly and the image is quite sharp. \$125. Contact Bob 603-472-2237 or neidorff@ti.com

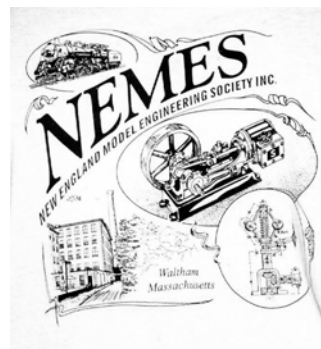


NEMES clothing

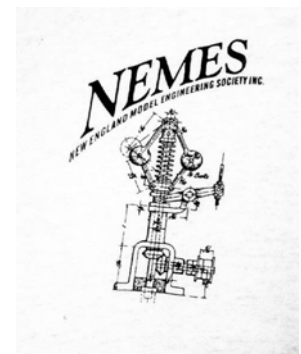
NEMES Tee Shirts

NEMES tee shirts and sweat shirts are available in sizes from S to XXXL. The tee shirts are gray, short sleeve shirt, Hanes 50-50. You won't shrink this shirt! The sweat shirts are the same color, but long sleeve and a crew neck. Also 50-50, but these are by Lee. The sweat shirts are very comfortable!

Artwork by Richard Sabol, printed on front and back:



Rear



Front

Prices:

	Tee Shirts	Sweat Shirts
S - L	\$12.00	\$22.00
XXL	\$14.00	\$24.00
XXXL	\$15.00	\$25.00

Add \$5 shipping and handling for the first tee shirt, \$1 for each additional shirt shipped to the same

address. Sweat shirts are \$7 for shipping the first, and \$1.50 for each additional sweat shirt.

Profits go to the club treasury.

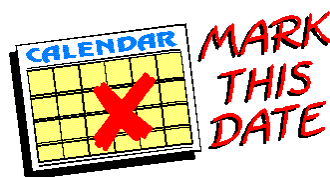
Mike Boucher
10 May's Field Rd
Lunenburg, MA 01462-1263
mdbouch@hotmail.com

NEMES Shop Apron



Look your best in the shop! The NEMES shop apron keeps clothes clean while holding essential measuring tools in the front pockets. The custom strap design keeps weight off your neck and easily ties at the side. The apron is washable blue denim with an embroidered NEMES logo on top pocket.

Contact Rollie Gaucher 508-885-2277



Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at wbracket@rcn.com or (508) 393-6290.

Nov 3rd Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA

Dec 1st Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA

Jan 21-22 Cabin Fever Expo
York, PA Gary Schoenly 800-789-5068

Feb 18, 2006 NEMES Model Show
Charles River Museum of Industry
Waltham, MA 781-893-5410

Bill

**Renew your NEMES membership
for calendar year 2006
Enclose check for \$25 made out to:
NEMES**

Name _____

Address _____

City _____ **State** _____ **ZIP** _____

Telephone _____

Email _____

**Please bring this form to the next
meeting or mail to:**

**Richard Koolish
212 Park Ave
Arlington MA 02476-5941**